164 CHILDREN WITH NEPHROSIS

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THE clinical syndrome characterised by albuminuria, hypoproteinæmia, and œdema was called nephrosis by Müller in 1905. This term has been differently interpreted by other investigators (Vohlard and Fahr 1914, Capon 1926, Evans 1932, Farr 1942, Galan 1949, Allen 1952, Todd 1957), and synonyms, such as tubular nephritis (Wolbach and Blackfan 1930), lipoid nephrosis (Block et al. 1948, Schwartz et al. 1943), lipæmic nephrosis (Heymann and Startzman 1946), and the œdematous syndrome of nephritis (Rennie 1947), have also been used. As type-II nephritis, Ellis (1942) referred mainly to adults with a concomitantly high mortality-rate, although the syndrome is in fact commoner in children, and is relatively benign. The term "protein losing kidney" was used by Platt in 1959 for this symptom-complex. With so many synonyms extant one must define the nomenclature. By the term "nephrotic syndrome" I mean considerable proteinuria, resultant low plasma-albumin content, and œdema, usually with hyperlipæmia. The pathogenesis varies widely, and some causes of the nephrotic syndrome may be outlined thus:

Neonatal nephrosis.—A familial disease, probably congenital and possibly hereditary, which is lethal. This disease is being recognised with increasing frequency.

Toxic nephrosis.—Proteinuria after ingestion of a drug, such as gold salts or tridione or a poison, such as corrosive sublimate; or a hypersensitivity reaction to stimuli such as bee stings or poison oak.

Collagen nephrosis.—A condition arising during the course of disseminated lupus erythematosus, anaphylactoid purpura, or polyarteritis nodosa.

Renal-vein thrombosis may present with the clinical picture of the nephrotic syndrome.

Symptomatic nephrosis.—In association with systemic disease, such as amyloidosis or diabetes mellitus; infections, such as syphilis; neoplasia, such as diffuse sarcomatosis; or myoglobinæmia.

Post-nephritis nephrosis.—A rare sequel of acute glomerulonephritis, which is accompanied or followed by impaired glomerular function.

"*Nephrosis*".—The bulk of all cases of the nephrotic syndrome in children in whom no obvious precipitating cause is apparent.

Throughout this paper I shall apply the unqualified term "nephrosis" to the last of these, that is to cases of the nephrotic syndrome which do not fall into any of the other groups, and with no obvious precipitating cause.

The Children Studied

The children were admitted to the Royal Hospital for Sick Children, Glasgow, between 1929 and 1957. Those with a cause for the nephrotic syndrome as already described have been excluded, and 5 cases of neonatal nephrosis will be reported elsewhere. There remain 164 children, and each case has been followed until March, 1959. 102 still survive, and of these 91 have been examined at the same hospital, and the other 11 at various clinics in England, Africa, Asia, Australasia, and the Americas. 62 patients have died, and the doctors responsible for their care, and for certifying the causes of death (or carrying out postmortems), have been questioned and the relevant reports scrutinised. Reasonably accurate assessment of the cause of death has been possible in each case, and all have been traced.

Extensive hospital records of each patient are available, with a detailed history and the physical findings by a junior and senior physician on admission. The daily volume of urine was recorded where possible, together with the protein content (Esbach method). Most patients were weighed and the blood-pressure recorded daily. Biochemical investigations included estimation of the non-protein nitrogen (N.P.N.) level in blood, and the serum-protein level. Fractionation of serum proteins was performed chemically (after Howe 1921) and/or by electrophoresis (after Cremer and Tiselius 1950). Blood-cholesterol levels were measured in 144 children by chloroform extraction (Leiboff 1924). In some recent cases detailed biochemical analysis of the urine and serum has been carried out by chromatography, bioassay, electrophoresis, and various other methods (Arneil and Wilson 1952, 1953a and b, Arneil 1956a and b, 1958, 1959).

Analysis of the Findings

The Incidence of Nephrosis

The number of cases beginning annually between 1929 and mid-1957 is shown in fig. 1:

During this period the total population of the area fluctuated in distribution but did not vary widely in total. In 1947–52 the birth-rate rose sharply on the return of the Armed Forces, and this increase in childhood population may partly explain the increased incidence of nephrosis in 1948–55. Since 1952 some children have been admitted to another pædiatric unit, and the number presenting at the Royal Hospital for Sick Children has been slightly reduced. The total child population (aged up to twelve years) from which these cases are drawn approaches 500,000, and the average number of admissions was 10 cases per annum (101 during 1948–57); hence the admission-rate for children with nephrosis in this decade was 2 per 100,000. This compares with the figure of 2·3 per 100,000 for children aged up to nine years in Ohio (Rothenberg and Heymann 1957).

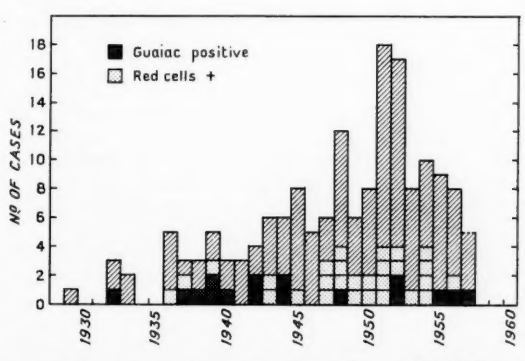

Fig. 1—Annual incidence of nephrosis from 1929 to 1957.
The peak at 1951–52 is difficult to explain. The stippled areas indicate patients with microscopic hæmaturia, and the dark areas those with gross hæmaturia (guaiac positive).

There is no seasonal incidence, the greatest numbers beginning in November, May, and August, and the fewest in December, March, and October.

The age at the onset of symptoms is shown in fig. 2, neonatal nephrosis excepted there were only 4 cases during the first six months of life. The peak incidence was in the twelve months from the seventh to the eighteenth month of age; 48 cases (20%) began during this period. Œdema started during the first year of life in 31 (19%) of the 164 children, as opposed to 2% in the composite American series of 425 cases (Barnett et al. 1952). The incidence increased in children aged five to seven years; this is when Scottish children first attend school and are there exposed to various infections. There was a similar increase in this age-group in Liverpool (Todd 1957).

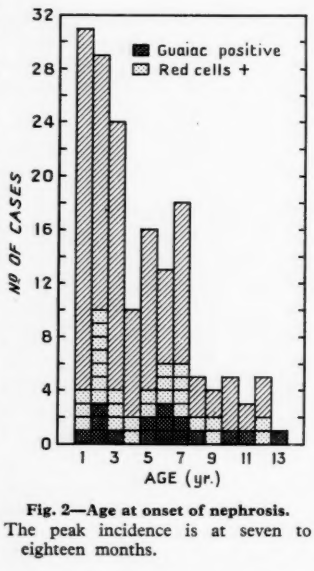

Fig. 2—Age at onset of nephrosis. The peak incidence is at seven to eighteen months.

There were 98 boys and 66 girls in the present series, giving a male/female ratio of 3/2, but this is not uniform. Of the children under eighteen months 25 were boys and 26 were girls. Among those aged eighteen months to thirteen years were 73 boys and 40 girls (1·8/1).

During 1948–57 the number of cases of nephrosis admitted to the Royal Hospital for Sick Children was 101, and there were 328 children with acute hæmorrhagic nephritis, giving a ratio of 1/3·3. A child with acute nephritis is more likely to be treated at home or in another hospital than is one with nephrosis, and this ratio is therefore biased.

Mode of Onset

Periorbital œdema drew the parents' attention to the illness in 156 of the children (95%) although its significance was not always realised until generalised œdema or ascites appeared. In a few cases swelling of the legs or infection was first noted. The time between the onset of œdema and admission to hospital ranged from less than a day to more than a year: 28% were admitted within a week, 78% within a month, and 98% within a year of onset. Earlier records were available for a number of children previously treated elsewhere.

The parents were asked if an infection or fever had occurred during the three weeks before the onset of œdema: this was reported in 53 cases (32%). The commonest infection was of the upper respiratory tract (in 32 cases [20%]), comprising coryza in 16 children, sore throat with pyrexia in 4, and indeterminate infections in 12. This respiratory infection might be fortuitous, or it might bear a causal relationship, or reveal a previously latent nephrotic state. Overt infection was present in 33 children at the time of admission to hospital, 5 of these having peritonitis. 6 patients gave a history of nephrosis immediately after immunising injections. Against the background of immunising procedures in young children this is not a significant number, but in individual cases the association of an urticarial reaction with the first injection, and nephrosis after the second, is difficult to gainsay.

Of the children aged two years or less, 16 had ingested considerable quantities of mercurous chloride for weeks or months before the onset of nephrosis. 6 others had not received this chemical, and 28 had ingested smaller amounts. Since " teething " powders were often given to babies in Glasgow during 1940–55, and the majority of these contained mercury, the importance of such observations is uncertain.

The total daily excretion of mercury by affected infants was significantly higher than in controls, but more significant is the fact that the incidence of nephrosis in children of six to eighteen months has dwindled rapidly since mercurous chloride was removed from teething powders in this area (1955–56). The maximal incidence of such cases during 1948–54 is difficult to explain when one considers how freely calomel was prescribed at the beginning of this century. If calomel provokes nephrosis then such cases seem to represent an individual sensitivity to the drug rather than simple overdosage. Alternatively some associated factor may have operated during this period, such as the nephrotoxic effects of the excessive calciferol given to many infants at this time.

Œdema

On admission periorbital œdema was noted in 162 children (99%), œdema of the ankles or sacral area in 155 (94%), and ascites in 77 (47%). In some boys the scrotum was grossly distended and required support. In other children the increased intra-abdominal pressure caused the umbilicus to be everted and the heart and liver to be displaced. Gross periorbital œdema occasionally obstructed vision and increased the liability to conjunctivitis. Pleural transudates were present in a few.

The œdema lasted for days, weeks, months, or years. In some children œdema was constantly present, and in others it was intermittent, with wide fluctuations. The degree of ascites and peripheral œdema did not necessarily run parallel, and they were sometimes out of proportion. Death from infection cut short the period of œdema in 39 cases. In the other 125, diuresis occurred within three months of the onset in 41%, within twelve months in 72%, and within two years in 86%.

Œdema persisted longer when hæmaturia was present initially, lasting less than three months in 45% of those without hæmaturia, in 33% of those with microscopic hæmaturia, and in 19% of those with macroscopic hæmaturia. The average period of œdema was shorter in younger than in older children, lasting less than three months in 73% of the children who were aged less than two years at the start.

The degree of œdema fluctuated widely and wildly, with partial diuresis from time to time. Complete shedding of œdema was sometimes spontaneous or due to treatment, or followed acute infection. Diuresis was accompanied by a dilution of the proteinuria owing to the increase in urinary volume. There was diuresis with loss of œdema and ascites in 111 children on 161 occasions. A child with fever perspires freely and may vomit or have diarrhœa. Water and sodium are lost by these routes, and œdema may decrease in consequence. Only when urinary volume clearly increases may the occurrence of diuresis be accepted.

Febrile illness was associated with severe infection in 74 children, and 34 (46%) of these died. Of the 40 (54%) who survived, diuresis occurred later in 21 (28%). The œdema recurred in 10 of these 21 children, and 4 of them have since died. It is often difficult to decide whether diuresis was

TABLE I—FACTORS RELATED TO DIURESIS

Time of diuresis after onset of nephrosis	Post-infective (within 10 days)	After treatment (within 20 days)	Unknown	All diureses
Less than 3 mos. ..	4	25	19	48
3–24 mos.	14	26	17	57
More than 24 mos. ..	3	8	2	13
Total	21	59	38	118

In 7 children diuresis followed treatment and infection at different times.

spontaneous or produced by a pyrexial incident or some form of treatment. An œdematous nephrotic may be given treatment one day, and diuresis begin the next day, without any necessary association between the two. In general, the longer the œdema has lasted, the more significant is diuresis beginning soon after treatment. For example, a boy had been œdematous continuously for five years, prednisolone therapy was started, and two weeks later he was free of œdema and has remained so for some years. This seems to be the result of treatment.

To give some idea of the relative importance of the various factors, these episodes have been split arbitrarily into three groups (table I). The apparent efficacy of treatment is fallaciously high when œdema has persisted for less than three months, because spontaneous remission commonly occurs at this time. Diuresis after treatment is more significant when œdema has persisted for 2 years or more, and in these children treatment with steroids may be effective. Immediately after diuresis one of three things happens; the œdema may return, proteinuria may continue without œdema, or the patient may become symptom-free. The final outcome after diuresis attributed to the various known factors is shown in table II. The

TABLE II—OUTCOME OF THE VARIOUS FORMS OF DIURESIS

Diuresis	Resulting state			No. of cases
	Dead	Proteinuric	Asymptomatic	
Spontaneous ..	*15%*	*7%*	*78%*	38
After treatment	*15%*	*17%*	*68%*	59
Post-infective..	*19%*	*33%*	*48%*	21
Total ..	*16%*	*16%*	*68%*	118

best results followed spontaneous remission, but this was most frequent in the early stages of disease. Remissions attributed to treatment in the early months of illness were probably spontaneous although coincident with treatment. The prognosis in the few surviving children in whom diuresis followed infection was worse than when diuresis was spontaneous or due to treatment.

Findings in the Urine

The urine from each child was tested for excess protein by acidifying and boiling, for hæmoglobin by the guaiac test, and for red blood-cells by microscopy. The volume of urine passed in each twenty-four hours was measured where practicable, and the protein content was estimated by the Esbach method. From these data the approximate albumin loss per day could be calculated. In some children the daily urinary output of sodium, chloride, and potassium was measured. Bidirectional partition chromatography was performed in a number of cases, with particular emphasis on whether nephrosis peptide was present (Arneil and Wilson 1953b).

Volume of urine.—Wide variations occurred in the daily volume of urine. During the initial oliguria the daily urinary output might be as low as 200 ml., and during diuresis it not uncommonly exceeded 4000 ml.

Proteinuria.—Albumin accounted for most of the protein in the urine although small proportions of globulins were sometimes present. The proteinuria ranged in concentration from 0·25 to 24 g. per litre, and in absolute terms from 0·25 to 10 g. per day. Proteinuria usually persists after diuresis, sometimes for a very long time. Amongst the 102 survivors in this series proteinuria persisted for more than five years in 14 children and for more than ten years in 5 children. In 74% of cases the daily loss of protein in the urine decreased after some weeks, months, or years. Such lessened proteinuria led to the asymptomatic state (a term I apply only when there is no abnormal proteinuria), to chronic proteinuria, or to a return of œdema. Before 1951 proteinuria did not usually recur if it had once been absent for weeks, as judged by a negative reaction to boiling. Steroids have made this sequence of events more common, and a transient absence of proteinuria is often followed by a return of proteinuria with or without œdema when inadequate steroid treatment is given or when respiratory infection provokes relapse.

Hæmaturia.—The frequency of hæmaturia (microscopic or macroscopic) at the time of admission ran parallel to the annual incidence, and it was fairly closely related to age (figs. 1 and 2). This agrees with the findings of Rothenberg and Heymann (1957). Macroscopic hæmaturia (as judged by a positive guaiac test) was present in 18 patients (11%), microscopic hæmaturia (equivalent to more than a million erythrocytes in twelve hours) in 29 patients (18%), and 135 (82%) had no evidence of hæmaturia on admission. Occasionally patients who had had no hæmaturia at first developed this symptom some months later. Heymann et al. (1958) showed that the red cells in the red urine of the nephrotics are usually intact in contrast to the many lysed cells found in the smoky brown urine of patients with acute hæmorrhagic nephritis.

Electrolyte Content of Urine

Sodium.—During the period of oliguria and œdema the daily output of sodium was very low, often amounting to less than 20 mg. per day. This may explain why a low-sodium diet can slow the formation of œdema but will seldom cause diuresis. During diuresis the urinary output of sodium rose to 6000 mg. or more per day in some children.

Chloride.—The output of chloride was roughly parallel with that of sodium, being as low as 30 mg. daily during œdema formation and as high as 11,000 mg. daily during diuresis.

Potassium.—The daily excretion did not fluctuate widely as did that of sodium and chloride. Potassium excretion rose significantly after treatment with chlorothiazide for more than a week, and it could have led to hypokalæmia if supplementary potassium had not been added to the diet (potassium chloride 4 g. daily).

Erythrocyte-sedimentation Rate

The erythrocyte-sedimentation rate (E.S.R.) was measured by the Westergren method in 58 children, and always exceeded 30 mm. in the first hour. In most the reading was in fact much higher than this arbitrary level. The E.S.R. remained high during the active period of the disease, being very much increased when the serum-albumin, as measured electrophoretically, was low. In the long-term follow-up, when patients were asymptomatic, the E.S.R. was within normal values; when proteinuria persisted the E.S.R. varied; and when œdema was present it was always increased.

Blood-pressure

Definite systolic and diastolic hypertension was noted in 10 children at the time of admission. In 4 of these the hypertension was considerable, and macroscopic hæmaturia was found. Some increase of the systolic pressure was present at first in 16 other children, but such minor degrees of hypertension may be emotional in origin or may result from experimental error, especially when there is œdema. Increase of the blood-pressure is not uncommon in the late stages of the illness when renal

TABLE III—SERUM-PROTEINS IN NEPHROSIS WITH ŒDEMA

Estimation of serum-proteins	Average result (g. per 100 ml.)	Standard deviation	No. of cases
Total amount	4·50	0·77	150
Chemical method:			
Total	4·38	0·74	116
"Albumin"	1·85	0·72	116
"Globulin"	2·53	0·47	116
Electrophoresis:			
Total	4·3	0·76	42
Albumin	0·9	0·38	42
α and β globulins	2·8	0·84	42
γ globulins	0·6	0·25	42

failure sets in. Initial hypertension is uncommon in the nephrotic syndrome of childhood, but when present it is usually accompanied by other signs of glomerular damage, such as hæmaturia and nitrogen retention. In the early stages of nephrosis without hæmaturia, hypertension is unusual (cf. type-II nephritis, Ellis [1942]).

Findings in the Blood

The non-protein nitrogen (N.P.N.) content of the blood was determined on admission in 161 children and it was less than 45 mg. per 100 ml. in 153 (95%). The N.P.N. was above 45 mg. per 100 ml. in 5 of the 18 children with macroscopic hæmaturia (28%) and in only 3 of the remaining 146 (2%).

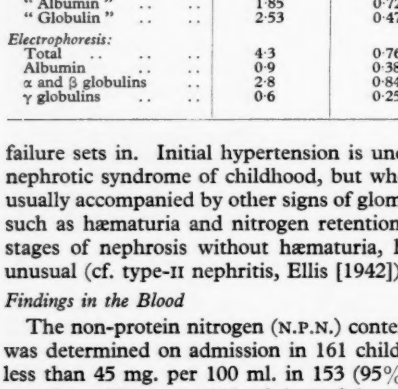

Fig. 3—Comparison of electrophoretic and chemical fractionation of serum-proteins in nephrotic children.

The latent inaccuracy of the "albumin"/"globulin" ratio is clearly shown.

The total serum-protein level was estimated in 150 œdematous patients, averaging 4·5 g. per 100 ml. (table III).

The wide divergence between the results obtained chemically and electrophoretically can be explained by the fact that the fraction designated "albumin" in the chemical method actually consists of albumin together with some *a* globulins; conversely the "globulin" fraction is decreased by the removal of these *a* globulins. This discrepancy affects the calculated osmotic pressure based on chemical estimation of serum-albumin content in such patients, as employed by Rennie (1933) using the formula of Govaerts (1926). The serum-proteins of 10 œdematous patients were synchronously fractionated by the two methods, giving the results illustrated in fig. 3.

Clearly the term "reversal of the albumin/globulin ratio" should no longer be used. The outstanding feature is the low level of serum-albumin, and there seems no reason why one should not simply say so.

TABLE IV—ELECTROPHORESIS OF SERUM-PROTEINS TWO TO TWENTY-EIGHT YEARS AFTER ONSET OF NEPHROSIS

Status	No. of cases	Mean serum—protein levels			
		Total ± S.D.	Albumin ± S.D.	α and β globulins ± S.D.	γ globulin ± S.D.
Asymptomatic	60	7·2±0·6	3·7±0·6	2·2±0·5	1·4±0·5
Slight proteinuria	9	7·4±0·8	3·6±0·8	2·4±0·5	1·4±0·3
Gross proteinuria	12	5·4±1·1	1·8±1·2	2·7±0·7	0·9±0·4
All cases	81	7·0±0·8	3·4±1·0	2·3±0·6	1·3±0·5

While œdema persisted the levels of serum-albumin and also of serum-*a*-globulin tended to remain low. and consequently the level of total serum-proteins was low. In general the nephrotic patient is œdematous when the electrophoretic serum-albumin is less than 1 g. per 100 ml. In 74% of this series the proteinuria decreased and the serum-albumin reached normal levels, and by this time the œdema had disappeared. In 81 patients biochemical tests were performed between two and twenty-eight years after the onset of nephrosis (table IV). The biochemical findings in the asymptomatic patients, and in those in whom very slight proteinuria persisted, had returned to average levels. When gross proteinuria still existed the abnormalities remained.

Blood-cholesterol levels, estimated by the method of Leiboff (1924) in 135 patients on admission, averaged 317 mg. per 100 ml., with a standard deviation of 129 mg. When albuminuria continued, hypercholesterolæmia tended to persist after diuresis. Increase of the blood-cholesterol above 150 mg. per 100 ml., as measured by the crude method of chloroform extraction, seems to be a fairly reliable indication of continuing activity. This method of estimation was used in the 52 cases later reviewed (table V). In those with continuing gross proteinuria the blood-cholesterol tended to be much higher than in the asymptomatic cases or those with very slight proteinuria.

TABLE V—BLOOD-CHOLESTEROL LEVELS TWO TO TWENTY-EIGHT YEARS AFTER ONSET OF NEPHROSIS

Status	No. of cases	Blood-cholesterol (mg. per 100 ml.)	
		Range	Mean ± S.D.
Asymptomatic	52	40–140	89 ± 25
Slight proteinuria	7	67–140	87 ± 22
Gross proteinuria	6	65–280	195 ± 85
All cases	65	40–280	97 ± 35

The Outcome

The overall results for the 164 patients whose illness started between January, 1929, and March, 1957, were:

	2 years after onset	*In March, 1959*
Asymptomatic	70 (*43%*)	80 (*49%*)
Proteinuric	50 (*30%*)	22 (*13%*)
Dead	44 (*27%*)	62 (*38%*)

The differences between the status two years after onset and the later outcome were considerable.

TABLE VI—MORTALITY AMONG 164 CHILDREN WITH NEPHROSIS

Years followed	No. of cases	Total deaths in this period	Deaths from infection	Deaths from renal failure
0–1	164	35 (*21·3%*)	28 (*17·1%*)	7 (*4·3%*)
1–2	164	9 (*5·5%*)	5 (*3·0%*)	4 (*2·4%*)
2–3	159	5 (*3·1%*)	1 (*0·6%*)	4 (*2·5%*)
3–4	151	6 (*4·0%*)	0 —	6 (*4·0%*)
4–5	142	2 (*1·4%*)	1 (*0·7%*)	1 (*0·7%*)
5–6	132	0 —	0 —	0 —
6–7	124	0 —	0 —	0 —
7–8	107	1 (*0·9%*)	0 —	1 (*0·9%*)
8–9	89	2 (*2·2%*)	0 —	2 (*2·2%*)
9–10	81	1 (*1·2%*)	0 —	1 (*1·2%*)
Estimated death-rate for 10-year group		*39·6%*	*21·4%*	*18·2%*

A long-term follow-up is always bedevilled by inability to pinpoint any alterations in the clinical state—except for that absolute occurrence, death. Table VI gives the time from recognition of the disease until death, which occurred within two years in no less than 44 of these cases (72% of all deaths.) The causes of death are less certain than the dates of death, but reasonable records have been obtained from the death certificates, by interviewing the parents and doctors concerned, and from hospital records and postmortem reports. Inaccuracies are likely to lie in deaths during the first two years being ascribed to renal failure, when they were in fact due to unrecognised infection in œdematous patients.

Infection was by far the most important cause of death during the first two years of illness, and after this came renal failure (fig. 4). The mortality of any series of nephrotic patients must be related both to the causes of death and to the length of the illness. 75 patients have been followed for ten to twenty-eight years and so far only 1 has died after the tenth year of disease. In calculating the mortality-rate the figure must be weighted to allow for the number of years during which the patients have been followed; the method used to calculate this figure is shown in table VI. The 62 children who died make the mortality 37·8%, but when this is weighted to allow for length of follow-up the estimated death-rate after ten years' illness is 39·6%.

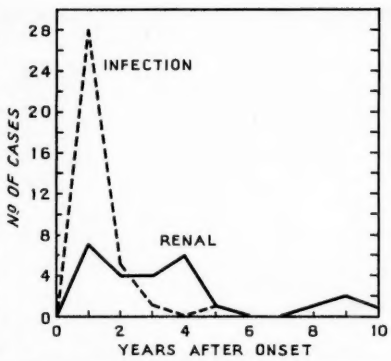

Fig. 4—Time and cause of death in 61 children with nephrosis.

Note that death from infection was virtually confined to the first two years after onset.

Because the results from various centres contain so many variable factors they are only crudely comparable. In table VII comparison is made of this series with two groups of cases from London (Lawson et al. 1960) and Boston (Barness et al. 1950):

These results are biased against the Boston series because their findings were before 1948, and in favour of the London series which does not include reliable figures relating to the period before 1945. (Although the results of previous years were included by Lawson et al. 44 (56%) of 78 patients were not traced.) 7% of cases from London, and 15% from Boston, were not traced; but there is nevertheless a remarkable similarity in the estimated mortality (Glasgow 38%, London 37%, and Boston 42%) and in the number of patients who were symptom-free after two years (49%, 48%, and 41%).

TABLE VII—COMPARISON OF THE SURVEYS OF NEPHROSIS FOR THREE COUNTRIES

Results	Scotland (Glasgow) 1929–57	England (London) 1945–57	United States (Boston) 1926–46
No. traced	164 (100%)	102 (93%)	136 (85%)
No. followed two years	164	102 (?)	107
No. dead	62 (38%)	38 (37%)	45 (42%)
No. alive	102 (62%)	64 (63%)	62 (58%)
No. symptom-free	80 (49%)	49 (48%)	44 (41%)
Total cases	164	110	161

Factors Related to Prognosis

Duration of Œdema

The œdematous period was counted from the first appearance of œdema until its *final* disappearance. Periorbital œdema, which is readily perceptible, gives a relatively accurate index of the onset. The disappearance of sacral or ankle œdema can be less accurately defined, and errors may cause underestimation of the period of œdema, but this can usually be assessed with reasonable accuracy by the experienced clinician. The estimated overall results are given in table VIII.

The mortality-rate and persistence of proteinuria are directly proportional to the period of œdema, whereas return to the asymptomatic state is inversely related. Many of the deaths during the first two years of œdema were due to infection, but deaths from this cause are rare today. Excluding these, 92% of children in whom œdema lasted less than three months are free from symptoms, whereas only 22% of children in whom œdema lasted two years or more are in this state.

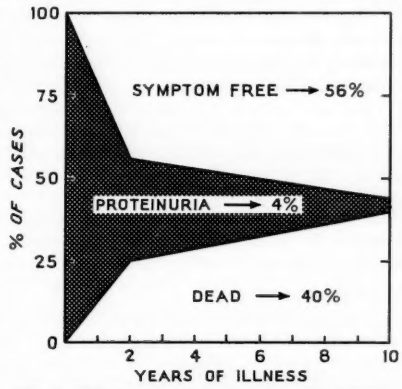

Fig. 5—The pattern of nephrosis in 164 children during the first ten years after onset.

Proteinuria, present in all cases at first, had decreased to 4% at ten years. Of the 30% of patients with proteinuria two years after onset 12·6% died, 4% continued to have proteinuria, and 13·4% became symptom-free after ten years.

Duration of Proteinuria

In some cases it was only possible to say that the proteinuria had lasted for at least *x* months and less than *y* months. In others, where proteinuria was persisting, say, in 1944, six years after the onset, and was still present in 1958, it was assumed to have remained throughout. For these reasons the figures in this section of table VIII must be regarded as approximations. The proportion of deaths was highest in the patients whose proteinuria lasted for three to twelve months, when deaths from infection and renal failure were both relatively common. Again deaths from infection distort the results; when recalculated without these deaths, there is a direct relationship between the period of proteinuria and death or continuing disease, and an inverse relationship between proteinuria and apparent recover.

Fig. 5 illustrates the pattern of continuing proteinuria or death for the 164 children during the ten years after the onset of illness. Excluding deaths from infection, the proportion of patients without symptoms after ten years of disease was 72%. This speculative figure is suggestive of the results which might be expected from control of infection alone.

Sex and Age at Onset

The prognosis for the two sexes differs considerably (table IX).

TABLE VIII—CLINICAL RESULT AND DURATION OF ŒDEMA AND PROTEINURIA IN 164 CASES OF NEPHROSIS

Outcome	Duration of œdema			Duration of proteinuria			Total
	Less than 3 mos.	3–24 mos.	More than 24 mos.	Less than 3 mos.	3–24 mos.	More than 24 mos.	
Survivors	48 (75%)	43 (54%)	11 (55%)	24 (65%)	44 (56%)	34 (69%)	102 (62%)
Symptom-free	46 (72%)	30 (38%)	4 (20%)	24 (65%)	44 (56%)	12 (24%)	80 (49%)
Proteinuria	2 (3%)	13 (16%)	7 (35%)	—	—	22 (45%)	22 (13%)
Dead:	16 (25%)	37 (46%)	9 (45%)	13 (35%)	34 (44%)	15 (31%)	62 (38%)
From renal failure	2 (3%)	17 (21%)	7 (35%)	12 (32%)	20 (26%)	4 (8%)	36 (22%)
From infection	14 (22%)	20 (25%)	2 (10%)	1 (3%)	14 (18%)	11 (23%)	26 (16%)
Total no.	64	80	20	37	78	49	164

TABLE IX—CLINICAL OUTCOME OF NEPHROSIS IN CHILDREN ACCORDING TO SEX, AGE AT THE ONSET, AND INITIAL HÆMATURIA

Outcome	Males	Females	Age at onset		Hæmaturia (all grades)	No hæmaturia
			1–8 mos.	1½–13 yr.		
Surviving	56 (57%)	46 (71%)	36 (71%)	66 (58%)	11 (38%)	91 (67%)
Asymptomatic	46 (47%)	34 (52%)	32 (63%)	48 (42%)	10 (35%)	70 (51%)
Proteinuric	10 (10%)	12 (19%)	4 (8%)	18 (16%)	1 (3%)	21 (16%)
Dead:	43 (43%)	19 (29%)	15 (29%)	47 (42%)	18 (62%)	44 (33%)
From renal failure	18 (18%)	11 (17%)	3 (6%)	23 (21%)	11 (38%)	25 (19%)
From infection	25 (25%)	8 (12%)	12 (23%)	24 (21%)	7 (24%)	19 (14%)
No. of cases	99	65	51	113	29	135

More males died, and more females continued to have proteinuria. This difference is partly explained by the higher proportion of males dying from infection, and partly by the sex-distribution of those under eighteen months at the time of onset (39% female and 26% male).

The 164 cases showed a high incidence before eighteen months of age, and a steady incidence from eighteen months onwards with a small peak at five to seven years (fig. 2). The outcome of these two groups is shown in table IX.

The death-rate from renal failure is much higher in the older children (21%) as compared with the younger (6%). Death from infection was roughly comparable (23% compared with 21%), but proteinuria persisted twice as often in the older children (16% and 8%). Estimation of the mortality for the first ten years after onset (as in table VI) gave a calculated death-rate of 30·3% for the younger children as compared with 44·2% for the older ones.

Hæmaturia

Some red blood-cells are normally present in urine, and an absolute count (such as the Addis count) is essential to detect minor anomalies. Since this was not done routinely it is only possible to distinguish gross hæmaturia (guaiac test positive) and microscopic hæmaturia present when the guaiac test was negative. Hæmaturia was recorded at the onset of nephrosis in 29 cases, and the course of these patients is compared with that of the other 135 in table IX.

When hæmaturia was present initially the death-rate for these children was 62% compared with 33% for those without hæmaturia. The mortality was increased because there were more deaths from infection and renal failure. I would emphasise that the hæmaturia was noted at the same time as gross proteinuria and œdema, and it did not obviously precede these. When hæmaturia was gross at first a degree of hypertension and/or nitrogen retention was usually present.

In general it seems that the prognosis is inversely proportional to the duration of œdema or proteinuria. The outlook is better in young children (apart from the congenital group) than in older children. The mortality is less in females than in males, but more females have long-continued proteinuria. Initial hæmaturia heralds a higher mortality-rate from both infection and renal failure.

Treatment

Between 1929 and 1957, these children with nephrosis were given many forms of treatment, which may be summarised as follows:

Dietetic Measures
- Low-sodium intake
- High-protein intake
- Restricted fluid intake

Intravenous Infusions
- Gum acacia
- Plasma, in various concentrations
- Blood
- Plasma substitutes (dextran, salt-free dextran, &c.)

Diuretics
- Urea
- Potassium salts
- Inorganic and organic mercurials
- Aminophylline

Physical Procedures
- Paracentesis abdominis
- Subcutaneous drainage with Southey's tubes
- Hot packs
- Hot-air cage
- Drainage of local pyogenic lesions

Antibacterial Agents (therapeutic and prophylactic)
- Antibiotics

Steroid Hormones
- Corticotrophin
- Cortisone
- Prednisolone
- Methylprednisolone

"Therapeutic" Infections
- Measles
- Malaria

Other Drugs
- Kation-exchange resins
- Carbonic-anhydrase inhibitors
- Vasopressin
- Thyroideum siccum

Since 1957 chlorothiazide and hydrochlorothiazide, triamcinolone and dexamethasone, spironolactone, and dried human albumin have been used.

Before 1951 many different treatments were used synchronously or consecutively on each patient, and it is virtually impossible to disentangle the results. Only an impression of each type of therapy can be gleaned from the records:

Dietetic treatment.—Before 1951 the intake was limited to 1200 ml. of fluid and 87 mEq. of sodium daily. Since 1951 the fluid intake has been unrestricted, and the sodium intake has ranged from 22 to 87 mEq. (0·5 to 2 g.) daily. The restriction of sodium seldom promoted diuresis but it seemed to reduce the rate of œdema formation. The urinary sodium output during periods of œdema was often less than 1 mEq. per day, and the lowest intake of sodium was 22 mEq. daily. A high-protein diet made little difference, and this is probably more useful in older patients (Blainey 1954).

Diuretics are now unnecessary except when steroid therapy has failed. The results of treatment with urea, potassium salts, or aminophylline were unpredictable, temporary, and of dubious value. Mercurials, whether inorganic or organic, are nephrotoxic, possess no unique virtue, and should not be used for nephrosis. Chlorothiazide is an effective diuretic agent but it does not seem to arrest the proteinuria, and when it is used the electrolyte balance must be monitored. Spironolactone seemed to be no more useful than chlorothiazide in provoking diuresis.

Intravenous infusions, by increasing the plasma osmotic pressure, may cause diuresis. Blood, plasma, plasma substitutes, or human albumin may produce transient diuresis, but such treatment is symptomatic and seldom of permanent value, and it causes diminution of œdema rather than suppression of proteinuria. Despite attempts to revive interest in individual cases (Williams and Ryan 1958), this type of treatment has been outmoded by adequate steroid therapy aimed at eliminating proteinuria and not merely relieving œdema.

Physical procedures.—It has rarely been necessary to drain ascites or œdema from a nephrotic child since 1956. Purgation, hot packs, and hot-air cages are obsolete. Œdema can be removed by adequate treatment with steroids in most children.

Antibacterial agents.—If there is significant bacterial infection, either before or during steroid therapy, it is now treated with full doses of sulphonamide, penicillin, or other appropriate antibiotic. With effective antibiotics the bogy of pneumococcal infection has largely disappeared. The routine use of prophylactic antibiotics is unnecessary in hospital or during steroid therapy. It should be prescribed if a patient previously rendered symptom-free by steroids has relapsed after respiratory infection. The usual antibiotics for prophylactic use are now sulphadimidine (0·5 g. b.d.) or phenoxymethyl-penicillin (125 mg. b.d.).

TABLE X—STATUS OF 164 CHILDREN AT TWO YEARS FROM ONSET OF NEPHROSIS

Status	1929–36 (low-sodium intake; pre-sulphonamide)	1937–45 (Sulphonamides)	1946–50 (Penicillin, chloramphenicol, streptomycin, &c.)	1951–55 (Cortisone and corticotrophin)	1955–57 (Prednisolones)	1929–57 (Total all forms of treatment)
Alive	64%	66%	62%	81%	91%	73%
Asymptomatic	28%	32%	48%	42%	64%	43%
Proteinuria ..	36%	34%	14%	39%	27%	30%
Dead	36%	34%	38%	19%	9%	27%
No. of cases ..	11	41	37	53	22	164

The state of *all* cases of nephrosis is included, irrespective of the treatment given. The dates refer to year of onset.

The Treatment of Nephrosis with Steroids

Reports from Glasgow have already given the results of treatment with corticotrophin (Arneil and Wilson 1952), cortisone (Arneil and Wilson 1953a), prednisolone (Arneil 1956a, 1958) and triamcinolone and chlorothiazide (Arneil 1959).

A suitable time to assess the clinical status of the disease seems to be two years after the onset (fig. 5). To compare the results of therapy the 164 children were divided into five groups, and table x shows the status in each group after two years. Interesting comparison can be based on historical sequence although it is a poor statistical method. The results of treatment improved progressively until 1951, and the overall state was little improved by the use of corticotrophin and cortisone. When prednisolone was used the improvement was very great, not only in the reduction of deaths from infection but also in shortening the period of proteinuria and œdema. It seems that cases which in 1946–50 would have died remained alive although some had continuing proteinuria.

Since admission to the present series stopped, in March, 1957, the newer delta steroids have been used, including triamcinolone, methylprednisolone, and dexamethasone. The results in 34 cases after eight weeks were very good (94% without œdema and 74% without proteinuria), even though some of these were "chronic" cases previously resistant to cortisone therapy; a third of these children have relapsed to some extent. Moreover, in most patients treated with large doses, these steroids produce side-effects, such as cushingoid obesity with moon-face, hirsutism, and particularly gross cutaneous striæ, which are much more pronounced than those with adequate doses of prednisolone. Thus, in Glasgow we still regard prednisolone as the best steroid available.

Steroids are now used primarily to eliminate proteinuria and maintain the patient in the asymptomatic state with as small a daily dose as practicable. Adequate steroid therapy has the following results in many children (fig. 6):

Proteinuria decreases, usually within two weeks, and it may cease altogether.

Diuresis of water, sodium, and chloride occurs, usually within two weeks, and the œdema and ascites disappear.

The serum-albumin and *a*-globulin levels rise, and the lipæmia recedes.

The patients' nutrition improves, and they gain weight.

The liability to infection decreases.

The E.S.R. returns to normal limits.

These changes may be temporary or permanent. Diuresis precedes the rise in plasma-albumin and approximately coincides with the diminution in proteinuria. Individual patients may recover after a short period of steroid therapy, some require long-continued or repeated courses of treatment, and others fail to respond to adequate and prolonged therapy. The response is most favourable when there is no initial hæmaturia, when the disease has been present for less than a year, and when the patient is aged between six months and six years. Intercurrent coryzal infection not uncommonly precedes a relapse of proteinuria and œdema, which may be transient, or severe and long-continued.

Present Scheme of Treatment

Diet

During steroid therapy, the diet should contain less than 88 mEq. (2 g.) of sodium daily; it should be isocaloric with the actual or estimated intake before treatment; and it should be low in carbohydrate content and high in protein unless nitrogen retention is present.

Antibiotics

Any initial infection should be treated with large doses of antibiotics before starting steroid therapy, and any infection occurring during therapy should be treated with the appropriate antibiotic forthwith.

Prophylactic treatment with sulphadimidine or penicillin should be given if relapse seems to have been triggered by respiratory infection.

Steroids

The initial dosage is 60–80 mg. of prednisolone per day irrespective of the size of the patient. This is reduced over a period of six weeks, and maintained at 10–20 mg. thereafter for between six and forty-six weeks. Prednisolone is then discontinued provided proteinuria has ceased or becomes very slight (100 mg. per day). Longer periods at higher dosage levels are necessary if the response is not good.

If gross proteinuria returns while the steroid dosage is being reduced, this is increased and thereafter reduced more slowly.

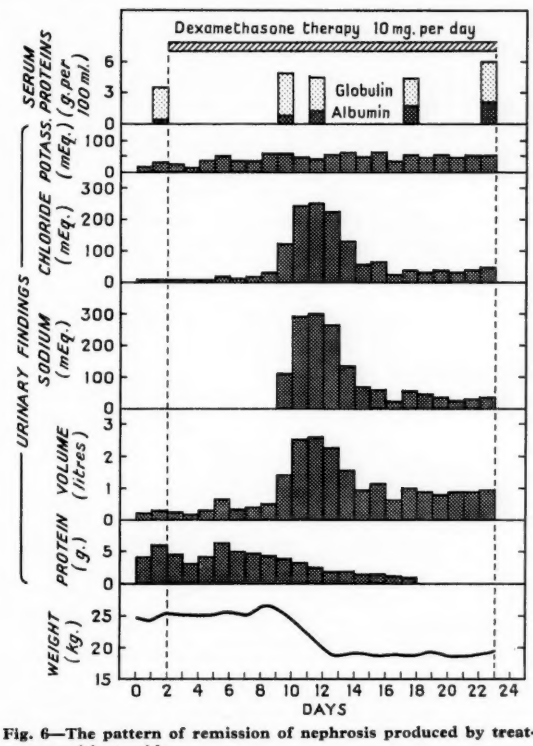

Fig. 6—The pattern of remission of nephrosis produced by treatment with steroids.

Note the very great diuresis of water, sodium, and chloride which is synchronous with loss of œdema and body-weight, and which precedes the rise in plasma-albumin.

Chlorothiazide

This is used as palliative treatment aimed at reducing œdema when steroid therapy fails. The dosage required is 1–4 g. daily, and supplementary potassium chloride (2–4 g.) must be given if treatment extends beyond a few days. Spironolactone is useful in a similar way.

The child with evidence of glomerulonephritis such as hæmaturia, hypertension, and nitrogen retention presents a problem because the results of treating such cases with steroids are poor. The present policy in Glasgow is to allow the hypertension to regress and the hæmaturia to dwindle before starting steroid therapy.

In children with an illness with such a good prognosis as nephrosis it seems unethical to perform renal biopsy as a routine. This should be reserved for unusual cases, and for use in units undertaking major research including electron microscopy.

Conclusions

A schematic diagram of the nephrotic syndrome is shown in fig. 7. This mixture of clinical, statistical, and biochemical findings gives an overall impression of the complex factors at work. Nephrotic œdema seems to be the resultant of many differing causes acting through the common pathway of gross proteinuria, much as the various defects in cardiac rhythm, myocardial function, or the vascular tree result in cardiac œdema. An abnormal antigen-antibody reaction to viral or bacterial infection seems a possible causal factor in children. Steroids are thought to act by interfering with this.

Like that of Hooft and Eckels (1960), my view of the overall outlook for nephrosis in childhood is one of cautious optimism. This is based on:

The natural tendency to recovery which this survey has demonstrated in most patients.

The control of infection by antibiotics, and shortening of the period of œdema and excessive protein loss by steroids.

The reduction in mortality and morbidity from both infection and renal failure since the use of adequate steroid therapy.

Even without any more effective treatment than that available in 1956 the estimated rate of return to the asymptomatic state after childhood nephrosis is at least 75%.

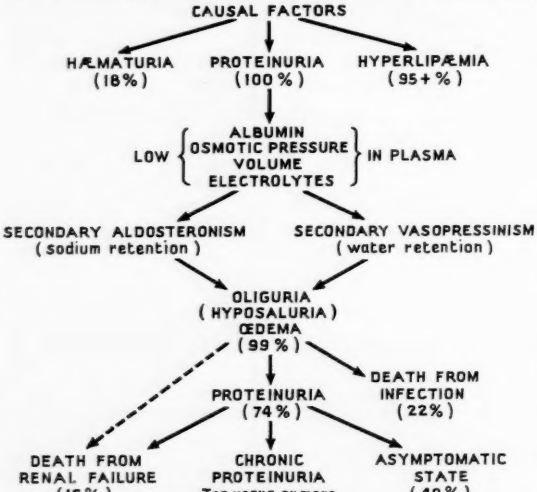

Fig. 7—Schematic impression of the nephrotic syndrome.

The figures in parentheses refer to the present survey. This chart also indicates the probable site of action of various treatment. Low-salt diet aims at mitigating the effects of sodium retention, and infused plasma or substitutes at temporary replacement of low plasma-albumin levels; steroids act much farther back, probably between "causes" and "proteinuria".

This paper should not be construed as applying directly to adults, in whom the causes of the nephrotic syndrome are often different. Nevertheless the work of Blainey et al. (1960) strongly suggests that even in adults an unnecessarily gloomy view was taken by Ellis (1942), whose classification is not applicable to children.

Summary

Between 1929 and 1957, 164 children with nephrosis were admitted to the Royal Hospital for Sick Children, Glasgow. Each child was followed until 1959 (the minimum period of observation being two years), or until death.

The presenting feature was usually periorbital œdema. Proteinuria, hypoproteinæmia, hypoalbuminæmia, hyperlipæmia, and an increased erythrocyte-sedimentation rate were invariably present. The blood-pressure and non-protein nitrogen level were within normal limits in more than 90% of the children. Hæmaturia was present in 18%.

The prognosis was inversely proportional to the duration of proteinuria and œdema. The outlook was better in young children and in females. Hæmaturia at the onset indicates a worse prognosis.

No form of treatment was consistently successful before 1951, when steroid therapy was introduced.

Adequate steroid therapy produces immediate improvement in most cases. Œdema usually disappears, proteinuria diminishes, and the plasma biochemistry returns to normal limits. The mortality and morbidity from both infection and renal failure has decreased since steroid therapy came into use.

75% of children with nephrosis will now eventually return to the asymptomatic state, and the gloomy outlook of previous decades is outdated.

I am deeply grateful to Prof. Stanley Graham for his untiring encouragement in this work. The tenacity and skill of Mrs. M. Baird in successfully tracing this large group is beyond praise. Dr. H. E. C. Wilson performed the numerous biochemical estimations, and Prof. J. H. Hutchison allowed access to case-records and to patients in his wards.

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"POLYMYALGIA RHEUMATICA"

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IN recent years there have been many accounts of an obscure and long-continued illness affecting elderly people, the main clinical features being widespread non-articular pain, malaise, depression, loss of weight, slight fever, and sweating. The most striking pathological investigation has been an extremely high erythrocyte-sedimentation rate (E.S.R.), associated with moderate normochromic anæmia, and various disturbances of the plasma-proteins. This kind of illness has been called polymyalgia rheumatica (Barber 1957, Gordon 1960), anarthritic rheumatoid disease (Bagratuni 1953, 1956), periarthrosis humeroscapularis (Meulengracht and Schwartz 1952), periextra-articular rheumatism (Holst and Johansen 1945), a myalgic syndrome of the aged with systemic reaction (Kersley 1951), *pseudo-polyarthrite rhizomélique* (Forestier and Certonciny 1953), and giant-cell arteritis or arteritis of the aged (Paulley and Hughes 1960); and no doubt others have devised yet more names for the same kind of clinical picture, depending on the manifestations which seemed most striking, and on their theories as to the nature of the trouble. Since "polymyalgia rheumatica" has been used by two workers, and also by the *British Medical Journal* (1957, 1961) and *The Lancet* (1961), it seems best to adopt this term, although it is not wholly satisfactory for reasons which will be discussed below.

The Patients

Between 1952 and 1959 twenty cases of this kind came under my care. One patient has died of causes apparently unrelated to the illness being considered here; the others have all been observed until recently. The findings are summarised in the table.

Clinical Picture

Sixteen (80%) of the patients were women, and four (20%) were men. Their ages when first seen were between 61 and 78. Though in a few the onset was fairly recent and sudden, as a rule the illness began insidiously, most patients saying they had been unwell for months.

The most prominent symptom, which was invariably present, was *general malaise*. Patients complained of feeling persistently "ill", "rotten", or "weak", and this was often accompanied by depression, which was sometimes severe.

Pain, other than headache, was a leading symptom in eleven cases. Its site and severity varied greatly. The neck and back were the commonest sites, but it was also felt in the limbs, and it was sometimes said to be almost universal. The pain seemed to arise from the soft tissues rather than from the joints, and there was never definite evidence of active joint disease. There was sometimes indefinite tenderness in various places.

Nine patients complained particularly of *headache*, which varied in character, situation, and severity. Sometimes it was widespread and continuous. In case 3 the head was tender at first, but the site of the tenderness varied from day to day, and there was no local evidence of cranial arteritis.

Sweats, chiefly at night, were reported by five patients. Three were admitted to hospital, and all had fever, with maximum temperatures of 101°F. Of the other five patients who were in hospital at first, three had slight fever and two were afebrile. The only patient not admitted to hospital who had taken her temperature regularly was case 12; she had a good deal of fever, reaching a maximum of 103°F.

Two patients (cases 13 and 14) both said they had lost about 3 stone (42 lb.) in weight. Another nine patients thought they had lost weight, though only two knew how much.

Investigations

The maximum E.S.R. (Westergren, in 1 hour) varied between 75 and 138. In thirteen patients there was at some time a reading above 110, and in nine above 120.

When the E.S.R. exceeded 100 some anæmia was always present, and the higher the E.S.R. the lower in general was the hæmoglobin level. The anæmia was normochromic and resistant to treatment in all but three patients. Case 7 had pernicious anæmia (initial Hb 68%) which responded to cyanocobalamin; cases 5 and 11 showed evidence of iron deficiency, and their anæmia was improved by iron. The white-cell count was never appreciably abnormal.

DETAILS OF THE TWENTY CASES

Case no.	Sex and age at onset (yr.)	Date when first seen	Whether in hospital	Symptoms: Malaise	Headache	Other pain	Sweats	Fever (max. °F)	Weight-loss	Highest E.S.R. (mm. in 1st hr., Westergren)	At time of highest E.S.R.: Hb (Haldane %)	Serum-albumin*	Serum-globulin*	A/G ratio	Electrophoresis of globulins	Differential sheep-cell agglutination test
1	M 71	May, 1952	No	+	+	+	−	?	+(?)	85	90	..	..	..	..	..
2	M 73	August, 1952	No	+	+	−	−	?	+(?)	118	75	..	..	..	..	..
3	F 67	April, 1953	Yes	+	+	−	−	100	+(?)	122	60	..	..	..	..	..
4	F 65	May, 1954	No	+	−	−	−	?	0	85	90	3·6	4·6	0·75	β+†	−
5	F 66	December, 1955	No	+	−	−	−	?	0	118	70	1·1	7·6	0·12	α_2, β, and γ+	−
6	M 61	May, 1956	Yes	++	−	+	++	101	14 lb.	138	60	2·9	5·4	0·67	..	−
7	F 67	June, 1956	No	+	+	+	−	?	0	94	90	3·9	4·1	0·9	β and γ+	..
8	F 66	December, 1956	No	+	−	+	++	?	16 lb.	128	73	5·0	2·8	1·8	..	−
9	F 62	May, 1957	Yes	+	−	+	++	101	0	124	75	3·8	3·5	1·1	α_2, β, and γ sl.+‡	..
10	F 69	May, 1957	Yes	+	++	+	−	−	+(?)	125	60	3·6	2·5	1·4	All + ..	−
11	F 63	July, 1957	Yes	+	−	−	++	101	+(?)	130	50	3·3	2·5	1·3	..	−
12	F 71	September, 1957	No	+	−	−	+	103	0	120	83	3·5	5·1	0·7	All +, α_2++	−
13	F 61	September, 1957	No	++	+	++	−	?	42 lb.	115	70	3·5	3·3	1·1	..	−
14	F 74	November, 1958	Yes	++	−	+	−	−	42 lb.	84	70	3·3	3·3	0·94	..	−
15	F 78	November, 1958	Yes	++	−	+	++	101	+(?)	137	60	3·2	3·5	0·9	All +, α_2++	−
16	F 73	February, 1959	No	+	−	−	−	?	0	82	90	3·2	3·4	0·9	Normal	..
17	F 62	March, 1959	No	+	+	−	−	?	0	75	90	4·3	3·0	1·4	α_2 and β sl.+	..
18	F 72	March, 1959	Yes	+	−	++	−	99·4	0	116	75	3·8	2·7	1·4	α_2 sl.+	−
19	M 73	May, 1959	No	++	++	−	−	?	+(?)	129	70	4·0	6·0	0·67	α_2 and γ+	−
20	F 71	July, 1959	No	+	−	++	−	?	0	107	80	3·6	4·4	0·8	α_2, β, and γ+	−

* Measured in grammes per 100 ml. † 2 years after highest E.S.R. ‡ 18 months after highest E.S.R.

x2

The serum-proteins were estimated in seventeen patients (twice or more in sixteen of them). At the time of maximum disturbance the serum-globulin was never below 2·5 g. per 100 ml.; in fourteen patients it exceeded 3 g., and in four it exceeded 5 g. At the same time, the albumin/globulin ratio was less than 1 in nine patients, and more than 1 in eight. Electrophoresis was performed in twelve cases; in all except one some increase in the globulin fractions was reported at some time, but there was no characteristic pattern.

The differential sheep-cell agglutination test was done in thirteen cases and it was always negative.

Treatment and Prognosis

Eight patients were admitted to hospital, most of them for a few weeks only; they were treated by rest in bed. Many of the others spent various periods in bed at home. Those who had pain were given salicylates, and cases 18 and 20 were also given phenylbutazone, which seemed to give greater relief than salicylates.

Only case 12 had steroids. Because of repeated febrile attacks, prednisolone was begun in July, 1959, 18 months after the onset of symptoms. She had this on and off, in a maximum dose of 10 mg. daily, until January, 1961. Last July, though her E.S.R. was 82, she had felt well for several months. Some of the other patients would probably have been given steroids if they had been seen later.

All the patients have improved, though there have often been minor relapses. Yet in only two patients has the E.S.R. become persistently normal:

In case 1 the E.S.R. was high from May, 1952, until January, 1955, the maximum figure being 85; but from July, 1956, until he died of a stroke in April, 1958, it did not exceed 10. The E.S.R. of case 3 was increased between April, 1953, and June, 1954, the maximum figure being 122; and since April, 1955, it has not exceeded 9. Another patient (case 2), whose E.S.R. was 118 in January, 1953, improved very rapidly after this, and since November, 1955, his E.S.R. has varied between 22 and 13. These three patients have been observed for the longest time. No doubt the E.S.R. of others will become normal in due course.

Despite a greatly increased E.S.R., many patients have improved strikingly or even become symptom-free.

One patient (case 14), who in June, 1958, had been ill for 6 months with profound weakness and anorexia, had gained 14 lb. in weight and denied all symptoms 2 months later, although her E.S.R. was 80.

In September, 1957, another patient (case 13) seemed most unwell with malaise, depression, and a weight-loss of 3 stone, but she had greatly improved a month later although her E.S.R. was 110, and she has remained fairly well since.

When case 19 was first seen in May, 1959, he was as ill as anyone in this series and was extremely depressed, but he was much better in a few weeks. Within 6 months his weight had increased by 8 lb. and he had few symptoms, though his E.S.R. was 90. He has since remained well, but his E.S.R. was 80 in May, 1960, and 44 a year later.

Discussion

The illness here described is much the same as that recorded by Bagratuni (1953, 1956), Barber (1957) Gordon (1960), Kersley (1951), and others, except that whereas all their patients apparently had widespread non-articular pain, nine of my twenty patients had no such complaint. The simplest way of explaining this difference is that these other workers did not accept into their series cases without this kind of pain. My reason for including them is that in all other respects they resembled those who did have pain. Moreover, assessing pain is peculiarly difficult; and, even when it has some organic basis, its severity depends largely on psychological factors. Two patients may seem to be affected in similar degree by a disease; but the first hardly complains of pain, whereas the second is in constant " agony ". Another complicating factor is that, because many people believe themselves to be habitual sufferers from " fibrositis " or " muscular rheumatism ", the mere complaint of non-articular pain does not necessarily mean much. In other conditions it is rarely claimed that absence of pain excludes a diagnosis: cardiac infarction or rheumatoid arthritis are typically painful, but no-one would say that these diagnoses cannot be made because a patient does not complain of pain.

The inclusion of patients without pain under the heading of polymyalgia rheumatica is unsatisfactory, because this implies that pain is present. But at present it seems better to use this term rather than attempt to devise yet another label.

How is the illness best classified? Should it be considered a rheumatoid variant, or should it be put into some other category? The main differences from rheumatoid arthritis are the absence of joint disease, the ultimately favourable outcome, and the older age of onset. On the other hand, the very high E.S.R. with normochromic anæmia and disturbance of plasma-proteins, the much greater frequency in women, the sweating, fever, malaise, and weight-loss, and the response to steroids are all features of the more severe examples of both this illness and rheumatoid arthritis. It seems that the similarities outweigh the differences, and that, in our present state of knowledge, this illness should be regarded as a rheumatoid variant.

Paulley and Hughes (1960) put forward the hypothesis that patients with this kind of illness are suffering from " giant cell arteritis, or arteritis of the aged ", and they specifically suggested that Bagratuni's (1953, 1956) patients should be placed in this category. Paulley and Hughes analysed seventy-six of their own cases. Thirty presented with eye symptoms (obliterative arterial disease in twenty-eight, and obliterative venous disease in two), nine with coronary-artery disease, eight with cerebral thrombosis, thirty-two with classical temporal arteritis, and sixteen with pyrexia of unknown origin. (These separate figures do not add up to seventy-six because some patients presented with more than one manifestation.) Thirty-two patients had as a prominent complaint " anarthritic rheumatism ", with widespread pain but no apparent joint disease.

Although many of their patients appear to have had the same kind of illness as that being considered here, Paulley and Hughes' reasons for identifying these cases with their other patients, who presented with manifest arterial disease, are unconvincing. In my series two patients only had manifest arterial disease—one (case 1) died of a stroke 6 years after the illness started and 2 years after his E.S.R. had become normal, and another (case 6) who had what were thought to be cardiac infarcts 18 months and 2 years after the onset of his illness. But three episodes of arterial disease in twenty people of this age over a period of nearly 10 years is no higher than average.

Even if the illness is accompanied by arteritis, as Paulley and Hughes suggest, it does not follow (as they imply) either that the arteritis is the supreme and essential feature or that a rheumatoid label is incorrect. Many observers have noted the association between rheumatoid arthritis and widespread arteritis. Thus Gibson et al. (1946) described widespread arteritis in the muscles of patients with rheumatoid arthritis; Sokoloff et al. (1952) found arterial involvement, characteristically affecting all coats, in the muscles of five of fifty-seven cases of rheumatoid arthritis; and, in neuropathy complicating rheumatoid arthritis, Hart and Golding (1960) found diffuse arteriopathic changes affecting many organs and also the arteries supplying peripheral nerves.

It is often asked whether this illness is an " entity ", or a " true syndrome ", or a " disease *sui generis* ". Such

questions imply that human maladies are in fact separable into entities which have some sort of independent reality, and that we fail to separate them in practice because of lack of knowledge, intelligence, or thoroughness. But why should Nature behave so conveniently? It is far more likely that what we think of as entities merge insensibly into each other, and that our diagnoses are only approximate pigeonholes for our help and guidance. In many situations one cannot draw a line between conditions which are generally regarded as entities: bronchopneumonia merges insensibly into acute bronchitis, and essential hypertension into normality. This is particularly so with the rheumatic disorders: people argue at length as to whether ankylosing spondylitis is a distinct entity or a subdivision of the entity rheumatoid arthritis, and similar arguments are heard about psoriatic arthropathy and Still's disease. Patients are seen who at first appear to have rheumatoid arthritis and later reveal the manifestations of systemic lupus erythematosus. Typical cases of rheumatic fever and rheumatoid arthritis differ greatly, but others fall into an intermediate category, and there is much uncertainty as to whether the label of rheumatoid arthritis is justified in minor cases. If it is agreed that a case with very slight swelling and tenderness of two proximal interphalangeal joints but without constitutional disturbance should be diagnosed as rheumatoid arthritis, what of the patient whose sole complaint is one painful and tender but not swollen interphalangeal joint? Increasing knowledge may in time enable us to improve our classification of maladies; there is no reason to suppose that finality can ever be reached.

According to Paulley and Hughes (1960) "a depressive state, often concealed, invariably precedes the somatic manifestation of the disease by a few weeks or months". But I am dubious about this, because the patients were presumably not seen until the somatic illness had developed, and therefore the report of previous depression depended on memory. To substantiate this view one would have to have studied a number of patients who were at first merely depressed, but who later developed the somatic manifestations.

Paulley and Hughes also regard psychosomatic factors as most important in ætiology, though they point out that "the types of stress precipitant, and the personality make-up, are not at present distinguishable from those found by one of us (J. W. P.) in most collagen diseases, particularly rheumatoid arthritis". Among the incidents which preceded their patients' illnesses, and which they imply were causal, were the death or marriage of a near or dear one, the death of pets, the admission of a beloved one to hospital, and ungracious treatment by relatives. But they do not supply enough data for a critical analysis of their belief that the illness is psychosomatic. The mere discovery of "stressful" incidents in a proportion of patients proves very little unless one can show that similar incidents are much less common among comparable controls.

In my series only one patient brought to light evidence which suggested that "stress" was a causal factor. This was case 6—perhaps the illest patient of all. He had found his wife dead when he returned from work, and soon afterwards he had become ill. Though he denied this had upset him unduly, such denials cannot necessarily be taken at their face value. No other ætiological factors were apparent. Most of the others who have written about this kind of illness have been equally unsuccessful in their search for the cause.

Conclusion

The most important thing about the illness described in this paper is to realise that it exists; for, although much has been written on the subject, many still seem to be unaware of it. There must be many affected patients, labelled in various ways. Many of the milder cases are no doubt said to have "fibrositis" or "rheumatism" or to be "generally run down". One may suspect that the severer cases are often admitted to hospital for investigation with such diagnoses as myelomatosis, Hodgkin's disease, multiple metastases, polyarteritis nodosa, systemic lupus erythematosus, or dermatomyositis in mind. But if one remembers that this illness is benign and far more common than the conditions just mentioned, many cases can be studied in much better perspective, numerous investigations can be avoided, and the patients and their relatives can soon be reassured.

Summary

Twenty cases are described, the main features of which are malaise, widespread pain, low fever, sweats, weight-loss, depression, a very high erythrocyte-sedimentation rate, and a lengthy but favourable course. The illness usually starts insidiously, it affects older people, and it is much commoner in women. The cause is unknown.

The condition is similar to that termed polymyalgia rheumatica, anarthritic rheumatoid disease, periarthrosis humeroscapularis, periextra-articular rheumatism, and various other names, except that nine of the twenty patients had no widespread non-articular pain, whereas in other series this was apparently a universal complaint.

Despite the absence of pain in many cases "polymyalgia rheumatica" seems to be the best name because it is the one which has been most widely used.

I wish to thank Dr. C. C. Thomas for the pathological investigations.

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A NEW PATTERN OF "IRON LUNG" FOR THE PREVENTION AND TREATMENT OF AIRWAY COMPLICATIONS IN PARALYTIC DISEASE

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WHEN in 1929 Drinker and McKhann introduced the "iron lung" (breathing machine; cabinet, tank, or body respirator), it was soon accepted as being the first machine capable of maintaining effective artificial respiration for a long time with relative comfort for the patient. Since then the cabinet respirator has been evolved by trial and error in several countries, and various patterns employing the same principle have been used in this country for about a quarter of a century.

With the older types of respirator the handling of severe cases of poliomyelitis and other neuromuscular

disorders associated with serious weakness of the breathing muscles was none too easy. Indeed, although they were lifesaving in the majority of cases, inherent risks were associated with all respirators of that pattern, particularly because of the inaccessibility of the patient and the lack of manœuvrability. Recognising these faults the breathing machines group of the Ministry of Health working party made a concentrated effort to evolve a respirator in which the patient would be comfortable and accessible, and in which there would also be economy of space, rapid handling, silence, and functional efficiency. A performance specification was agreed; and, thanks largely to the mechanical skill of the late Captain G. T. Smith-Clarke, a machine which satisfied most of the criticisms was produced—the Coventry ' Alligator ' pattern (see Galpine 1954).

Complications of Respiratory Paralysis

Of the many complications to which the respiratory cripple is prone, none is more potentially or actually fatal than airway obstruction or defective alveolar function associated with collapse, congestion, or pneumonia.

In the Western Hospital's necropsy reports for the past 22 years lung damage is a depressingly constant feature. In general this was more massive than could usually have been suspected before death, owing to difficulties of physical examination. While many of these postmortem findings were in cases admitted to hospital at a late and complicated stage of disease, there were many other complications which appeared to have developed after admission. After many unfortunate experiences I am convinced that many of the serious lung complications could have been prevented or treated had it been possible to apply the physics of drainage and to maintain patency of the terminal airway. This is essential for the prevention of alveolar respiratory failure, towards which artificial respiration—a relatively simple matter—can contribute only partially.

When the patient with respiratory paralysis can make only a feeble effort to cough (as exemplified by a vital capacity in an adult of 500 ml. or less), and when his cough function is even more crippled by abdominal muscle paralysis (a common combination), he is in considerable danger of accumulating not only normal respiratory mucus and humidity but also the increased " wetness " which is commonly found in the acute stage of diseases such as poliomyelitis. This may be the result of both inflammation and increased alveolar transudate from various causes in which congestion resulting from circulatory defects can be incriminated.

It is therefore of the utmost importance in preventing and treating lung complications to maintain alveolar respiration as far as possible. A major contribution is the provision for the weak or paralysed patient of both the gradient for secretional flow and the vis-a-tergo which can only be effectively produced by human and mechanical effort in the form of an assisted or " artificial " cough.

Barach et al. (1952a and b, 1953) have claimed to do this by various mechanical devices, the basic principles being to produce a high inflationary pressure of the lungs followed by rapid exsufflation, often with negative pressure assistance. Forbes (1958) claimed success by giving patients in the iron lung high negative (intra-cabinet) pressures followed by sudden release and positive-pressure assistance to expiration.

Galloway (1947) emphasised the importance of postural drainage for patients in the respirator when secretions are accumulating because of loss of cough power. Earlier (1940) he had reported its value in laryngotracheobronchial obstructions and their secondary effects. Hill (1928) showed that ciliary action may be twice as effective if aided by gravity.

Kubicek (1949) believed that atelectasis and congestion from hydrostatic pressure in the dependent parts of the lung could in large measure be relieved or avoided by proper mobilisation of the patient. He admitted that it is difficult to turn a patient in a respirator, but he thought that in many instances it would determine the patient's life or death. He urged that the patient be turned completely from side to side at least every hour, and claimed that this should relieve the congestion of the dependant parts of the lungs, improve aeration, and save them from more severe damage; it should also provide periodic drainage of the mucus and saliva from the bronchial system. My colleagues and I have also emphasised the importance of lung drainage for the patient treated in a respirator (Kelleher et al. 1956).

Gradient is an important factor in the physics of lung drainage as applied so commonly in the inclined plane of a postural drainage bed; in cabinet respirators tilting devices have usually been incorporated. But it is obvious from study of the inclination of the bronchial tree that to encourage postural drainage of the lung bases with the patient *supine* calls for an uncomfortably steep incline of perhaps 25° or more, although good drainage can be achieved when the patient is *prone* and horizontal. A head-down tilt of only 10–15° can then incline the trachea as much as a tilt of 25–30° when supine.

This extreme head-down tilt in the *supine* position, while easily achieved mechanically in the respirator, is most uncomfortable and cannot be long endured by the conscious patient. In the older patterns of respirator the more desirable prone or semiprone position could be managed either not at all owing to unsuitable design or where possible—e.g., in the modified Both-Nuffield respirator—only at the expense of much physical effort on the part of the staff (usually four nurses and a doctor) and alarm and discomfort to the patient. In the improved cabinet respirator already mentioned (Galpine 1954), it is easier to manhandle the patient into the prone position, but there are still the problems of manpower, delay, and disturbance to the patient.

The New Respirator

From experience in this hospital of hundreds of respirator cases, and from the observations of those cited above, I have long been convinced of the need for a tank respirator in which postural drainage would be facilitated with little effort for the staff and the least disturbance to the patient. This, it seemed, would only be possible if the body of the machine could be rotated in its long axis while the occupant was firmly but comfortably secured. For several years scale models were studied, with the help initially of Captain Smith-Clarke, but an efficient design was not evolved and finally developed until recently. This machine has now been in use at the Western Hospital for more than a year.

Details of the respirator's mechanism are briefly as follows:

Developed from the Coventry alligator respirator, the entire cabinet section is supported in a tubular framework by a trunnion bearing at either end. The connection between pump and cabinet passes through the bearing at the foot end, ventilation thus being maintained throughout rotation. The framework is mounted on a wheeled chassis, and it can be tilted up to 15° head-down in all rotational positions of the cabinet section. Rotation is controlled from the head end by a geared hand wheel and brake, and it can reach a full 180° from the supine position in either direction. During rotation the patient's head and neck are always clearly in view.

The patient is held securely throughout by a torso support (cuirass) supplemented by ankle and forehead straps, all fitted with quick-release fasteners of aircraft safety-belt type. The torso support which is of moulded fibre glass lined with foam plastic, encloses the front and sides of the patient from the

shoulders to below the knees, the arms being free and supported if necessary by wrist straps. A cut-out section in the fibre-glass over the epigastrium permits free diaphragmatic excursion without loss of support.

When the respirator is in the rotated position, a large hinged access panel in the underside of the cabinet (now uppermost) may be opened. Corresponding sections of the mattress support and of the sponge-rubber mattress can then be removed, giving free exposure of the patient's back and buttocks. Closure of the panel restores the internal pressure swing. Intra-cabinet pressures are shown on an additional pressure gauge near the panel. When the cabinet is open, synchronised positive-pressure respiration is available via a mouthpiece or facemask from a standard Smith-Clarke attachment mounted on the tubular frame just below the handwheel. Physiotherapy may be performed via two sleeved armports in the panel, the operator if necessary standing on one of two folding platforms attached to the chassis on either side, some 6 in. from the ground.

The machine has the following important advantages:

The basic cabinet design incorporates all the advantages of the Coventry alligator pattern machine already mentioned (Galpine 1954).

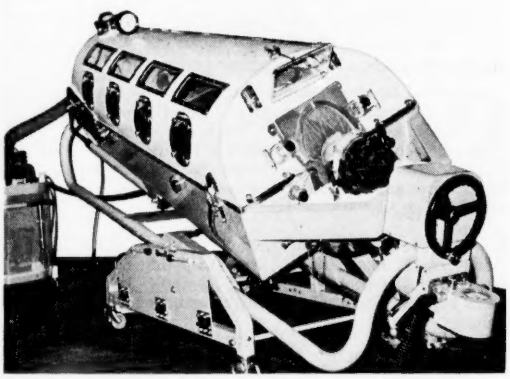

Fig. 1—The respirator partially rotated.
The patient is supine, with a head-down tilt of about 15°.

The body of the machine may be rotated in its longitudinal axis completely, or to any intermediate position.

Because the operation of the respirator pressures is not disturbed while rotating, artificial respiration continues without interruption.

Head-down tilt may be applied in whatever position of rotation the machine is checked (fig. 1).

The whole operation is easily performed by one person and with the least possible delay.

Rotation is so quick and easy, and it disturbs the patient so little, that it may be repeated frequently.

While the patient is prone, a hinged panel can be opened to expose his back from the cervical region to the natal fold for examination and treatment (fig. 2). Pressure sores are thus more easily prevented, and percussion and auscultation of the back of the chest are easily achieved.

Because the patient remains in the same position relative to the respirator body, and provided the strap supporting the forehead is already applied, no further adjustment to the head, neck, or collar is necessary during or after rotation.

Because the patient's position relative to the slope of the respirator collar and collar support remain unchanged, there will be no interference with the tracheostomy tube by the collar.

Intravenous drip therapy is undisturbed by rotation (the drip stand and bottle have merely to be shifted from one side to the other).

Chest physiotherapy (percussion, &c.) is easily performed through portholes provided in the " belly " and sides of the

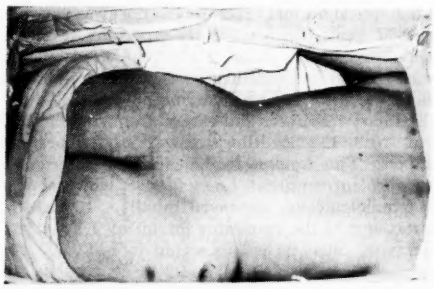

Fig. 2—Extensive exposure of the torso, which can be obtained when the respirator is rotated, by opening a panel in the base and removing a section of the mattress.

cabinet, either with the machine in the normal position or when it is inverted (fig. 3).

Since the rotary respirator has been installed in the artificial-respiration unit at the Western Hospital fourteen adult paralytic patients have been treated in it. Some of these were treated several times for recurrent episodes of bronchitis with retention of secretions and occasionally with atelectasis. These patients included four with acute poliomyelitis, three with toxic polyneuritis, and seven with chronic poliomyelitis and secondary chest infections.

Illustrative Case-reports

Case 1.—A woman of 38, who had had poliomyelitis 5 years previously, had a severe respiratory muscle defect and a residual vital capacity of about 500 ml. She had been re-admitted to hospital several times with respiratory or renal complications. After admission in March, 1960, for bronchial infection, her right lower and middle lobes collapsed. She was treated in the rotary respirator with frequent turning to the prone position and continuous artificial respiration, aided by vigorous chest physiotherapy with manually assisted cough. There was dramatic improvement in the atelectases 24 hours later, and virtual disappearance of the signs of collapse radiologically and clinically 6 days after onset.

The next case is an example of toxic polyneuritis (Guillain-Barré syndrome) in a patient who already had an acute exudative bronchitis before the onset of paralysis.

Case 2.—A woman of 54 had a 2-day history of the rapid onset of polyneuritis with symmetrical weakness. On her admission to hospital in January, 1961, her vital capacity was reduced to 550 ml., which was assessed as equivalent to 17%

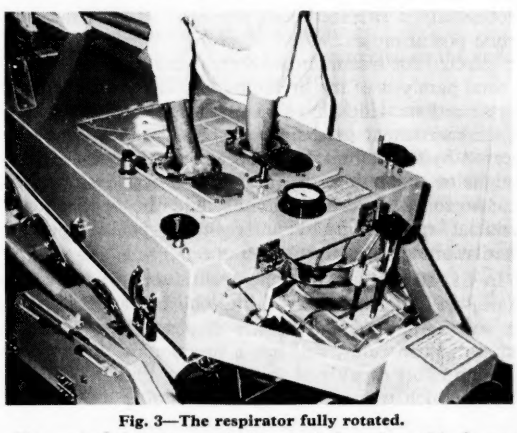

Fig. 3—The respirator fully rotated.
The patient is prone and the physiotherapist, with forearms through the portholes, gives chest compression synchronised with the machine's expiratory phase. (The hinged panel has been opened to remove a section of the mattress, and refastened.)

of the theoretical normal. Her cough effort was very poor. She was at first treated in a Coventry-type tank respirator, with manually assisted coughing and supine head inclination at intervals. Not much drainage was achieved, and bronchial secretions were obviously increasing. Next day she was put into the rotary respirator and turned frequently into the prone position, with 15° head-low inclination, for periods up to 30 minutes. This resulted in the expulsion of large quantities of very purulent sputum. The left base, which showed some collapse radiologically, improved rapidly. 10 days later she could stay out of the respirator for up to 2 hours at a time, and her vital capacity had increased to 1450 ml. Thereafter improvement was fairly rapid, and 3 weeks later she no longer needed assisted respiration in the machine. Her functional recovery was good.

Case 3.—A woman of 24 had been discharged from another hospital with a vital capacity of 1400 ml. after paralytic poliomyelitis contracted 14 months earlier. A respiratory infection developed 3 weeks after discharge, and she was admitted to the Western Hospital unit 3 weeks later in some distress, with retained bronchial secretions and a vital capacity reduced to 500 ml. There was no X-ray evidence of atelectasis, but her low capacity had been quite unequal to dealing with the secreuons, even with the help of vigorous physiotherapy daily in her home. She was placed in the rotary respirator and turned to the prone position, with synchronised chest compression in 10–15° head-low inclination, every hour or more often if required. The greater lung expansion provided by the respirator, together with chest physiotherapy and moist air inhalations, increased the mucus drainage rapidly, with obvious relief. She was allowed home 6 days later at her own urgent insistence to deal with family problems. Her vital capacity had by then again reached her normal of 1400 ml.

She was re-admitted 10 days later, very distressed, with a fever of 104°F and a vital capacity of only 400 ml. She was immediately given assisted respiration in the rotary respirator, combined with the physiotherapeutic measures previously adopted. A resistant *Staphylococcus aureus* was found in her sputum, and she was treated with appropriate antibiotics. 3 weeks later she was well enough to go home, her vital capacity having returned to 1200 ml. and the bronchial secretions having cleared.

Discussion

The value of cabinet (tank) respirators in the treatment of neuromuscular and other conditions associated with defects of the breathing muscles is well established in "dry" cases—i.e., where there is no pharyngeal paralysis with pooling, and/or the lungs are free from secretions. But many "wet" lung cases may be treated successfully if the secretions are dealt with by adequate prone posturing and aided coughing. These cases must be selected for treatment with great caution; for, if there is total paralysis of the breathing and abdominal muscles, the secretions which have been assisted upwards may be an embarassment in the larynx because they cannot be cleared by the patient, and only inadequately by artificial coughs or suctioning. Such a state is best dealt with by tracheostomy and a cuffed tube, and the application of artificial respiration by intermittent positive-pressure ventilation or the cabinet respirator.

In the acute stage of poliomyelitis and similar conditions, wet lung cases even with established atelectasis may be successfully treated in the respirator, provided the patient is conscious, and has a functioning pharynx *and* a cough effort capable of shifting more than 300–400 ml. of air. Such treatment, of course, implies an efficiently applied respirator and aided coughing, with adequate postural drainage particularly in the prone or semiprone position.

In postacute and chronic cases with a functioning pharynx and of course consciousness, an acute lung infection (even with a vital capacity as low as 100 ml., massive lung collapse, and a dangerous level of retained bronchial secretions) can in my experience always be successfully treated in a good cabinet-type respirator with assisted drainage. In the respirator, drainage, particularly of the bases but also when there are large and suffocating collections in the trachea and bronchi, is best dealt with in the prone or semiprone position, with assisted coughing by manual compression during the expiratory phase of the respirator pressures.

Patients *without* paralysis but with massive "wet" pneumonias and decreased respiratory effort may be greatly aided by the tank respirator, as in the cases recently described by Miller et al. (1960).

Summary

In a new type of respirator, for the first time, the cabinet can be completely rotated. This greatly facilitates the treatment of paralytic respiratory weakness.

The presence of lung inflammation with secretional complications of the lower airway is no contraindication to the use of cabinet respirators of modern design, when skilled and energetic chest physiotherapy is practised. Such treatment is greatly aided by postural changes, particularly prone and semiprone positioning.

I am grateful for the assistance provided by the devoted group of skilled physiotherapists under Miss Janet Higgens, and by the nurses, without whose help success would not be possible.

I am indebted also to my colleagues, Dr. E. P. O'Sullivan and Dr. P. H. Byles, for their encouragement and suggestions, and I remember with gratitude the technical skill of the late Captain G. T. Smith-Clarke, M.I.MECH.E., and the directors of the Cape Engineering Co.

I should like to thank the Council of the National Fund for Research into Poliomyelitis and other Crippling Diseases, and the South West Metropolitan Regional Hospital Board, for their financial support which allowed the construction of the prototype machine.

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PYELONEPHRITIS IN INFANCY AND CHILDHOOD

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PYELONEPHRITIS, a common condition in infancy and childhood, is diagnosed in 3–4% of patients admitted to the pædiatric unit of the Whittington Hospital. The present study was undertaken in an attempt to learn something of the course of this disease in young people.

Material

Consecutive children who had been admitted to the wards in the 10-year period 1950–60 and diagnosed as having pyelonephritis were circularised and invited to attend for follow-up. The study was limited to 100 children. 11 of the first 111 could not be traced and 1 had died. The others attended and were examined. The follow-up periods were: $^1/_2$–1 year, 20; 1–4 years, 52; 4–8 years, 23; 8–10 years, 5. The ages at first

attendance were: 0–1 year, 23; 1–4 years, 19; 4–8 years, 35; 8–10 years, 12; more than 10 years, 11.

Sex-distribution

There were 18 boys and 82 girls (M:F-1:4·5) 7 boys were less than 1 year old, and therefore in this age group the female predominance is not so distinct—7 boys to 16 girls (M:F-1:2·3).

Findings

SYMPTOMS

In this retrospective study of case-histories it was found that, whereas routine inquiry had invariably been made for details of micturition symptoms and abdominal pain in older children, this was not always so in infants and young children. In the 23 infants under a year of age, anorexia, fever, and vomiting were the most prominent symptoms. Abdominal pain was noted in only 5 and frequency of micturition and dysuria in 2. In contrast to this, micturition symptoms were present in approximately half the older children. In these circumstances it is felt that a more accurate picture of the symptoms is obtained by separating " presenting symptoms ", or those which took the mother to the doctor, from others mentioned in the history. Children with recurrent attacks of pyelonephritis tended to show the same pattern of symptoms in each attack. The symptoms present on the first occasion on which the child was admitted to the unit have been analysed.

Fever was present in 83 children and was accompanied by febrile convulsions in 4 and rigors in 3.

Abdominal pain was the most prominent symptom in children old enough to complain. 63 of the 77 children over a year old had abdominal pain, and in 48 of them it was a presenting symptom. Pain was located to one side in 19 children and in the back in 6. It was more often vague and generalised. 15 children experienced severe colicky pain.

Vomiting occurred in 53 children and was a presenting symptom in 32.

Micturition symptoms are important as they often provide the key to the diagnosis. 32 children had *frequency of micturition* and it was a presenting symptom in 28. *Dysuria* was noted in 41 children and was a presenting symptom in 28. 12 children were enuretic before their first attack of pyelonephritis, but in 13 *nocturnal enuresis*, sometimes associated with day wetting, was a presenting symptom. 10 children had macroscopic hæmaturia and a 3-week-old infant presented with hæmoglobinuria.

Only a quarter of the 100 children presented with micturition symptoms; half of them presented with abdominal pain and this was usually given as the reason for referral to hospital. The family doctor suggested the diagnosis of pyelitis in only 28 of the children, appendicitis in 13, " P.U.O." in 11, and paroxysmal tachycardia in 1 infant.

Concurrent illness—usually an acute upper-respiratory-tract infection—was present in 34 children. Other conditions were 1 case each of acholuric jaundice, intussusception, pneumonia, nephrotic syndrome, and rheumatic fever.

DIAGNOSIS OF PYELONEPHRITIS

The diagnosis of pyelonephritis was confirmed by finding numerous pus cells in the urinary deposit. Most of the specimens were cultured in the laboratory, but unless plating is done within an hour or so multiplication of bacterial contaminants obscures the results, and until recently no special measures were taken to ensure immediate plating. It is most important to know whether the patient has been taking drugs; for, if so, specimens cultured on admission to hospital are commonly sterile. When possible " clean " specimens were obtained; but in infants and toddlers it is often necessary to attach a plastic colostomy bag to the perineum, and there may be some delay before urine is passed by a febrile child, especially if he has been vomiting. Such specimens are not suitable for culture. Female infants and toddlers were occasionally catheterised, but this was exceptional. In most cases, therefore, the diagnosis depended on the presence of pyuria. During the past two years cell-counts have been made on uncentrifuged urine in a counting-chamber as described by Stansfield and Webb (1953), and specimens for culture have been plated immediately, colony counts being made after 24 hours. In recent years it has been realised that it may be necessary to examine several specimens of urine before the diagnosis of pyelonephritis can be confirmed, as pyuria is sometimes intermittent, especially in children who have had some treatment before being referred to hospital.

FOLLOW-UP STUDY

The patients were asked to attend the hospital bringing with them a sample of the first specimen of urine passed that day and prepared to pass a specimen on arrival. The children were weighed and measured and were submitted to full clinical examination including a blood-pressure reading. A " clean " specimen of urine was collected by the nursing staff in a sterile pot after the genitalia had been swabbed with sterile water. The specimen was transferred to a sterile bottle and plated on to McConkey's medium within half an hour of being passed, using a loop delivering approximately 0·01 ml. of urine. A colony count was made 24 hours later. The two specimens of urine from each child were tested for albumen, and cell-counts were made on both after shaking and transferring a drop to a Neubauer counting-chamber. The number of pus cells in a cubic millimetre were counted. If a clean specimen was not obtainable culture was omitted. No catheter specimens were taken.

It was found that the children could be divided into four main groups:

Group I: 61 children who had had one attack of pyelonephritis for which they had been treated on the unit.

Group II: 18 children who had had two attacks of pyelonephritis treated on the unit.

Group III: 11 children who had had one attack of pyelonephritis treated on the unit and gave a history of one or more attacks treated at home by the family doctor.

Group IV: 10 children who had been treated on the unit for three or more attacks of pyelonephritis.

1 child in group III had died of bronchopneumonia when 2 years old. She was admitted to another hospital 15 months after her first attack of pyelonephritis, and post-mortem examination showed a large staghorn calculus in the pelvis of the left kidney, associated with chronic pyelonephritis. A boy aged 2 years with bilateral hydronephrosis was considerably retarded and dwarfed and a girl of 10 months was much undersize. No gross clinical abnormality was found in the other children, and the blood-pressure was within normal limits in all.

Urine Examination at Follow-up

Stansfield and Webb (1953) found that the pus-cell count in normal children is usually below 10 cells per c.mm. of uncentrifuged urine; but higher counts do occur, especially in girls. Masters' (1953) findings were similar. Both these reports emphasise the wide range of leucocyte-

counts and the intermittency of the pyuria in cases of pyelonephritis.

American workers have stressed the importance of bacterial counts in the diagnosis of infection. Kass (1956, 1957) has designated a count of 100,000 organisms or more per ml. of urine as the dividing-line between true bacilluria and contamination, but his patients were adult women. Pryles and Steg (1959) examined specimens of urine from 170 young girls and suggest that counts of less than 1000 organisms per ml. indicate contamination, those exceeding 100,000 organisms per ml. indicate infection, and those ranging between these two figures are suspicious. Hinkle et al. (1960) believe that counts above 10,000 organisms per ml. in clean voided urine indicate infection in children. Masters (1953) carried out colony-counts using a loop delivering 3–5 c.mm. of urine, and came to the conclusion that in a non-catheter specimen the colony-count should not exceed 20—i.e., approximately 4000 organisms per ml. In the presence of urinary infection the count usually exceeded 100 colonies per loop—i.e., approximately 20,000 organisms per ml.

The loop used in the present series delivered approximately 10 c.mm., and the number of colonies counted is therefore multiplied by 100 to give organisms per ml. No attempt was made to count more than 100 colonies, the count being recorded as 10,000 + organisms per ml. if the number of colonies exceeded 100.

The urine of 87 children was considered to be free from infection at the follow-up examination. In 77 children the pus-cell count on the two specimens examined was less than 10 per c.mm. and the bacterial count less than 5000 coliform organisms per ml. on the 70 specimens suitable for culture. In 10 children the pus-cell count exceeded 10 cells per c.mm. in one specimen, but the highest bacterial count was 1400 organisms per ml. No pathogenic organisms were isolated at all from 50 specimens, and the bacterial count on 13 specimens was less than 1000 organisms per ml.

There was definite evidence of urinary infection in 10 children, all girls. The findings are summarised in table I, which shows only 3 of these children were symptom-free.

In 2 patients it was difficult to decide whether infection was present.

One was a woman, 20 years old, who was followed up $6^1/_2$ years after her first attack of pyelonephritis and had remained symptom-free. Three morning specimens of urine contained 200, 640, and 100 pus cells per c.mm., and two midstream "clean" specimens collected at the hospital 0 and 40 pus cells per c.mm. The bacterial counts were 7000 organisms per ml. on the first and 10,000 + organisms per ml. on the second of these specimens. The 2nd patient was a 9-year-old girl whose morning specimen of urine was free from pus cells, but the clean specimen contained 480 pus cells per c.mm. and the bacterial count was 8000 organisms per ml. Ten further specimens examined over the course of the next 6 months showed persistent bacilluria but no pyuria. This child had heavy leucorrhœa.

TABLE II—URINARY FINDINGS AT FOLLOW-UP IN 100 CASES

Urine	Group I	Group II	Group III	Group IV
Free from infection..	60 (98·3%)	14 (78%)	8 (80%)	7 (70%)
Infected	1 (1·7%)	4 (22%)	3 (20%)*	3 (30%)

* Including child who died.

The intravenous pyelograms on these 2 patients were normal, and the urinary findings were probably accounted for by contamination but this is obviously open to doubt.

The results of the urine examination on the four groups of patients are shown in table II. The child in group I whose urine was considered to be infected was a female infant admitted with pyelonephritis when 4 months old and followed up 8 months later (table I, case 6). This infant's urine was free from pus cells at the conclusion of treatment but no specimens of urine were cultured, and possibly the infection was not cleared initially. 2 boys in group IV were taking nitrofurantoin prophylactically at the time of follow-up. One has bilateral hydronephrosis and in both infection recurs when drugs are discontinued, but their urine showed no abnormality at follow-up.

Thus, in summary, whereas the urine of practically all children with a history of one attack of pyelonephritis was free from infection at follow-up, infection was found in half of those with recurrent attacks (if the 2 boys on prophylactic drugs are included) and in 1 in 4 of those with two definite attacks of pyelonephritis or a history of more than one attack.

All specimens of urine were tested for albumin at follow-up. The amount exceeded 30 mg. per 100 ml. in one specimen only, and in this instance the urine was infected.

RECURRENT PYELONEPHRITIS

Pyelonephritis is commonly a recurrent illness, and pyuria and bacilluria may occasionally be symptomless. Recurrent overt pyelonephritis or silent insidious infection may predispose to permanent renal damage. Recurrence is known to be favoured by congenital abnormalities of the renal tract.

40 children in this series had more than one attack of pyelonephritis (including the infant who was found to have infected urine at follow-up). 4 of these children (1 boy and 3 girls) had a congenital abnormality of the renal tract, and in a 5th child a large renal calculus was found at necropsy, leaving 35 children (4 boys and 31 girls) with recurrence from no obvious cause. Of these 35 children 10 (2 boys and 8 girls) had had three or more attacks of pyelonephritis. Therefore, although the

TABLE I—FINDINGS IN 10 GIRLS WITH URINARY INFECTION AT FOLLOW-UP

Case no.	Age (yr.) at follow-up	Length of follow-up	Morning urine: pus cells/c.mm.	"Clean" urine: pus cells/c.mm.	Culture of urine: coliform organisms/ml.	Clinical group	Findings
1	11	5 yr.	—	3500	1300	IV	Bilateral hydronephrosis and hydroureter. Recurrent febrile attacks with abdominal pain and dysuria
2	13	3 yr.	—	5000	10,000 +	IV	Hydronephrosis and hydroureter rt. side—treated surgically. Recurrent pyuria since infancy
3	7	6 mos.	—	3250	10,000 +	II	Lt loin pain and frequency of micturition
4	$4^1/_2$	6 mos.	—	2000	10,000 +	II	Abdominal pain and frequency of micturition
5	2	7 mos.	2000 +	2000 +	10,000 +	II	Frequency, dysuria, and nocturnal enuresis
6	1	8 mos.	600 600 800	—	—	I	Symptom-free
7	10	7 mos.	2000	1920	10,000 +	II	Symptom-free
8	9	13 mos.	50	150	6400	III	Symptom-free
9	10	20 mos.	1600	800	10,000 +	III	Nocturnal enuresis
10	9	3 yr.	1600	800	10,000 +	IV	Recurrent dysuria and pain in back

TABLE III—RECURRENT ATTACKS OF PYELITIS IN DIFFERENT AGE-GROUPS

—	Age (yr. at first attack)			
	<1	1–4	4–8	8+
Total	23	19	35	23
No. who had more than one attack*	5 (2)	7 (1)	19 (1)	9 (2)

* Number with renal abnormality shown in parentheses.

tendency to recurrent infections was greater in the girls, it was not confined to them.

Table III shows that infants were not especially liable to have recurrent infections; indeed, recurrence was more frequent in older children.

It would seem reasonable to suppose that the incidence of recurrence would increase with the length of follow-up but this was not so. Of 80 patients followed up for periods of from 6 months to 5 years, 32 (40%) had more than one attack of pyelonephritis; while of 20 patients followed up for 5 years or more 8 (40%) had more than one attack. Of the 35 patients who had a recurrence after treatment in hospital, 12 did so within 6 months and a further 16 within a year. 3 had a recurrence 1–2 years later, 3 2–4 years later, and 1 5 years later. This last was a boy who presented when 12 years old with hæmaturia, frequency of micturition, and dysuria. Intravenous pyelography, cystoscopy, and retrograde pyelography failed to show any abnormality of the renal tract. Treatment was continued for 9 weeks owing to persistent hæmaturia. The boy remained well for 5 years but then had a recurrence of hæmaturia, and his urine was again found to be infected. He was free of symptoms when he attended for follow-up 9 months later, and his urine was normal.

The cases have been analysed in order to determine whether the duration of therapy is related to recurrence. 65 children had no further attacks of urinary infection after treatment on the unit, and 35 had one or more further attacks. 5 children have been excluded from the comparison—4 with a congenital abnormality of the renal tract, and the child with a renal calculus at necropsy. The duration of treatment in the 30 remaining children was less than 5 days in 10%, 5–10 days in 27%, 10–14 days in 30%, and more than 14 days in 35%. The corresponding figures for the 65 children who did not relapse were 12%, 24%, 26%, and 38%. Only 4 children were treated for longer than a month in their first attack of pyelonephritis, and 2 of them had a further attack. Thus the incidence of recurrence cannot be related to the duration of treatment, at any rate when this is less than a month.

It has not been possible to relate the incidence of recurrence to the sensitivity of the organism to the drugs used. Most of the children were given sulphonamides initially, and almost all responded clinically with a fall in temperature and disappearance of pus cells from the urine, even though of 26 coliform organisms tested for sensitivity to sulpha drugs, 18 were resistant. The drug was often changed when the sensitivity of the organism became known.

Attempts to correlate the duration of symptoms before the start of treatment with the incidence of recurrence were also unsuccessful, as many children had received some treatment before admission to hospital.

Radiological Findings

Intravenous pyelography was always done on children who had more than one attack of pyelonephritis. 40 intravenous pyelograms had been carried out at the time of the child's first attack of pyelonephritis or following a recurrence, and a further 5 were done after the follow-up examination. A renal abnormality was demonstrated in 6. The abnormalities were bilateral hydronephrosis in 2 cases, and 1 case each of double pelvis and ureter, double pelvis and ureter with hydronephrosis, large right hydronephrosis, and hydrocalycosis with renal calculi. The last 2 children attended for follow-up 5 years after operation. They had remained symptom-free, and no abnormality was found on examination of the urine.

Discussion

Three previous follow-up studies on children with pyelonephritis have shown very high recurrence-rates (Wharton et al. 1937, Woodruff and Everett 1954, Macaulay and Sutton 1957). Wharton et al. followed up 30 girls 8–17 years after an attack of pyelonephritis; 21 of them had had one or more subsequent attacks. Woodruff and Everett followed up 76 girls, 5–23 years after an attack of pyelonephritis, and 22 of them had had one or more subsequent attacks. In both studies at the follow-up examination, abnormalities in the intravenous pyelogram and urinary infection were found twice as often in those who had had more than one attack of pyelonephritis than in those who had had one attack only. The findings in the present series re-emphasise the significance of recurrent urinary infections in both boys and girls.

Woodruff and Everett found that 19 of the 54 children who had one attack of pyelonephritis, and 6 of the 22 children who had more than one attack, had an acute respiratory infection at the same time. In the present series 14 of the 61 children who had one attack of pyelonephritis, and 16 of the 39 who had more than one attack, had an associated acute infection of the respiratory tract. The well-known fact that acute respiratory infections are common in childhood would hardly seem to explain the frequency of the association in both series, and the observation certainly warrants further investigation.

Of the 10 children who were found to have a urinary infection at follow-up 3 were symptom-free. In another child nocturnal enuresis was the only symptom, and this was probably not related to the presence of the urinary infection. Refined diagnostic procedures, such as the provocative pyrogen test (Pears and Houghton 1959) might reveal more silent infections of the urinary tract.

A gross congenital abnormality of the renal tract was demonstrated in 6 patients by intravenous or retrograde pyelography, but it is clear that further more detailed radiological studies are indicated in patients who have recurrent urinary infections when no abnormality is seen on the pyelogram. Hodson (1959) has shown that in chronic pyelonephritis the irregular loss of renal substance (which is due to scarring) can be demonstrated by means of a pyelogram if the renal outline can be distinguished; special techniques are sometimes necessary to achieve this. Williams and Sturdy (1961) investigated 24 children who had attended The Hospital for Sick Children, Great Ormond Street, on account of recurrent urinary infections and who were considered at the time to have no disorder of the urinary tract. No abnormality was found in 15 of these children; but 9 had pyelonephritis, several showing evidence of progressive pyelonephritic scarring.

The micturating cystourethrogam (Edwards 1961) shows abnormalities in the lower renal tract, such as bladder-neck obstruction and vesicoureteric reflux, both of which have been found in some patients with recurrent pyelonephritis.

TREATMENT

Stansfield and Webb (1954) compared the results of treatment in two groups of infants. The average time for clinical recovery and return of the urine to normal was 38·9 days in those treated for 2 to 6 months, and 83·3 days in those treated for 10 days or less. These findings and the high recurrence-rate in the present series, suggest that great attention should be paid to details of treatment and follow-up. The policy now adopted on this unit, when treating a child with pyelonephritis for the first time, is to give for 2 weeks full doses of a drug to which the organism is sensitive. Treatment is then discontinued if the urine is normal. A week later three specimens of urine are examined and cultured, and thereafter specimens are examined at intervals not exceeding a month for the next 6 months and then every 2 months until a year has elapsed since the original attack of pyelonephritis, as second attacks so often occur within a year of the first. Recurrence of pyelonephritis must be taken very seriously; and the family doctor is asked to refer the patient to hospital should symptoms recur, so that the urine can be fully examined before embarking on treatment, which should then be continued for at least 6 months. The appropriate drug is given in full doses for a month, and then the amount is reduced by half and given in divided doses twice daily. The patient is kept under supervision until his urine has remained free from infection for a year after treatment has been stopped.

It is essential to emphasise the importance of taking the prescribed drugs conscientiously, for symptoms often subside rapidly and treatment may then become erratic or be discontinued altogether. In this series, in several of the children who had recurrent attacks of pyelonephritis treatment at home was quite haphazard and was often given for only two or three days until symptoms abated.

A second attack of pyelonephritis, or a relapse during treatment, is an indication for radiological studies of the renal tract, which may reveal abnormalities amenable to surgery. Whether recurrent attacks of pyelonephritis are associated with an abnormality of the renal tract or not, it is often possible to keep the urine free from infection by judicious drug therapy, with considerable amelioration of symptoms. This seems to be a rational approach to the prevention of progressive pyelonephritic scarring. Careful supervision of these patients is mandatory; further urological investigations may be necessary, and it is important to assess from time to time the progress of the disease and the possibility of surgical intervention in patients with progressive scarring and contraction of one or both kidneys.

Summary

100 children who had been admitted to hospital with pyelonephritis were followed up 6 months to 10 years later.

Urinary infection was found to be present in 1 of 61 children who had had one attack of pyelonephritis, in 4 of 18 children who had had two definite attacks of pyelonephritis, and in 3 of 11 children with a history of more than one attack. Of 10 children who had had recurrent attacks of pyelonephritis 5 had either a urinary infection at follow-up or were having prophylactic treatment.

The chance of recurrence could not be related to age, length of follow-up, or duration of treatment. Second attacks occurred within a year of the first in 80% of children with recurrences, and the symptoms were similar to those in the first attack.

6 of the 100 children had an abnormality of the renal tract, and in 1 child a large renal calculus was found at necropsy. After a recurrence of pyelonephritis the renal tract should be fully investigated and prolonged treatment applied.

Each child who has had pyelonephritis should be followed up.

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MULTIPLE SCLEROSIS

TREATMENT OF ACUTE EXACERBATIONS WITH CORTICOTROPHIN (A.C.T.H.)

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THE pathogenesis of the established lesion of multiple sclerosis remains in the last resort obscure; but a good deal of circumstantial evidence suggests that the characteristic demyelination is secondary to an inflammatory process. Although there may also be some diffuse glial proliferation, the greater intensity of the changes at the edge of active plaques, and the concentration of plaques in the vicinity of small veins, suggest that perivascular exudation and œdema probably play a crucial part in the earliest stages of the lesions (Lehoczky 1960). There is also clinical evidence that inflammatory processes are involved in acute episodes of the disease. Rather more than a third of the forty exacerbations studied here followed overt though usually banal infections, and in another quarter the neurological illness was accompanied by low fever. The erythrocyte-sedimentation rate was raised in less than a third of the cases, but the cerebrospinal fluid showed an inflammatory response in nearly half.

Under these circumstances early exploitation of the anti-inflammatory action of steroid hormones in the experimental treatment of multiple sclerosis was to be expected, and there have been many such trials:

Fog (1951) described clinical improvement in fourteen of twenty-one patients treated with corticotrophin; and in a further paper (1952) based on thirty-one cases, he suggested

that a favourable response was seen mainly in recently deteriorated patients. Jönsson et al. (1951) reported similar findings in a smaller series, and they observed that cortisone was apparently less effective.

In 1952 Glaser and Merritt described significant but usually transient improvement in a third of thirty-three cases treated with corticotrophin. In 1953, however, Rowland and Randt found no objective change in nine cases similarly treated. In the same year Miller and Gibbons contrasted the apparent lack of response to corticotrophin in a small series of acute exacerbations of multiple sclerosis with the rapid recovery of a parallel series of cases of acute disseminated encephalomyelitis, and mentioned the possibility that these observations might reflect differences in the natural histories of the two syndromes rather than a differential therapeutic response.

Among later workers Cossa et al. (1956) reported apparent benefit in only one of six cases treated with corticotrophin, and Claisse et al. (1956) in less than half of a large series. The careful observations of Alajouanine et al. (1956) again yielded equivocal results, but indicated the possible value of the treatment in acute cases.

More recently Walcher (1959) has claimed that most mild and recent cases benefited from corticotrophin, but that the drug had no effect on severe and chronic lesions. In all new cases of multiple sclerosis, and in acute exacerbations, he advised the routine administration of prednisone because this is less likely than corticotrophin to induce troublesome side-effects.

All these observations were uncontrolled. Only Alexander et al. (1961), in treating a hundred and ten cases with corticotrophin and various steroid hormones, tried to control their observations by scoring disability numerically at successive examinations of matched groups of patients.

But the control seems to have been retrospective rather than contemporaneous, and the considerations which governed the selection of patients for treatment are not given. On the basis of this rather unsatisfactory method Alexander expressed conviction as to the value of treatment with corticotrophin, and he advised an initial period of *intensive therapy* with 80–180 units of corticotrophin daily by intramuscular injections for an average period of 22 days in cases with " full-blown moderate to severe " disease, followed by indefinite *maintenance treatment* with a dosage varying from 20 units every other day to 40 units daily. Cortisone and prednisone were by contrast completely ineffective, and Alexander et al. attribute this discrepancy to a possible therapeutic action of corticotrophin other than the liberation of cortisone, rather than to inadequate dosage with this hormone and its analogues.

The present investigation, begun in 1958, was designed to study the effect of giving corticotrophin in acute episodes of multiple sclerosis: a parallel investigation (Miller, Newell, and Ridley 1961) has confirmed the ineffectiveness of long-term maintenance treatment with oral prednisone in retarding deterioration or preventing exacerbations.

Method

For the purpose of this investigation, general practitioners in Northumberland and Durham were circularised and asked to refer to us all patients with recent episodes of suspected acute multiple sclerosis. During a 3-year period more than a hundred and twenty such cases were examined; of these the present trial is concerned with forty consecutive patients with unequivocal multiple sclerosis, who presented with *an assessable new symptom or sign of less than 14 days' duration and showing no spontaneous improvement*. Beyond this there was no preselection. The forty patients were randomly allocated between two treatment groups, one receiving corticotrophin and the other comparable injections of saline. The groups were generally comparable in sex-distribution, age, and duration of the disease, as well as in the proportions classified as showing initial episodes of multiple sclerosis, second or subsequent attacks during remission, or acute exacerbations of an existing disability of less than 10 years' standing.

Therapeutic Routine

The patients treated with corticotrophin were given 60 units of gel twice daily during the 1st week of treatment; 40 units twice daily during the 2nd week; and 60, 40 and 20 units on the 2nd, 4th, and 6th days of the 3rd week. Their diet was normal throughout, but the patients were given potassium chloride 1g. four times daily by mouth. Serum electrolytes were regularly followed, and there were no complications.

Patients in the control group were given comparable injections of saline only, and potassium chloride as above.

Twenty-two patients were given corticotrophin, and eighteen saline. The patients were kept in hospital for 3 weeks, during which both groups received standardised physiotherapy appropriate to their disabilities. The mean age at the time of treatment was 32·3 years in the treated group and 37·4 years in the control group. There is no significant difference between these two mean ages ($t=38$; df$=1{\cdot}597$; $P>0{\cdot}1$). The treated group comprised six patients with characteristic initial episodes of multiple sclerosis, eight with acute exacerbations during remission, and eight with significant acute deterioration of existing disability. The comparable figures in the control group were two, six, and ten.

Assessment of Results

In these cases, as in our control trial of maintenance treatment (Miller et al. 1961) the disability was scored on admission and discharge by the numerical system described by Alexander et al. (1958). Unfortunately in this investigation this method did not furnish an adequate basis for comparing the results of treatment because the acute disability of the exacerbation represented too variable a fraction of the total disablement. We were therefore reluctantly driven back to a more subjective assessment of the results, less satisfactory in the last resort, but validated in some degree by the fact that it was always made by one observer (H. M.) who was unaware of the group to which the patient belonged.

The clinical course of these patients during the 3 weeks of hospital observation was classified as A, B, or C:

To category A were allocated those where it was felt that an observer unfamiliar with the course of multiple sclerosis would have regarded the patient as showing an undoubted response to treatment. In all these patients significant improvement followed within a few days of starting corticotrophin, and the exacerbation had cleared up entirely or almost entirely by the end of the 3-week period.

These cases contrast with those allocated to category C, where there was no improvement or where improvement in the recent symptoms was insignificant at the end of the 3-week period.

The patients in category B were those who did not clearly fall into either of the previous two groups.

Each case was allocated at the conclusion of the treatment, and comparison of the results at the close of the trial showed that the twenty-two patients treated with corticotrophin comprised eleven in category A, eight in B, and three in C: comparable figures for control cases were four in A, seven in B, and seven in C.

The difference is statistically significant: $\chi^2=1$; df$=4{\cdot}569$; $P<0{\cdot}05$ (Armitage 1955). It indicates that the chances are less than one in twenty that the observed beneficial effect of corticotrophin in promoting recovery was due to chance.

Discussion

We cannot pretend to be satisfied with this method of measuring therapeutic response, because it relies so heavily on subjective considerations; but the procedure was the least unsatisfactory we could envisage under the circum-

stances of the trial. Its validity would of course have been greatly enhanced if it could have been supplemented by some objective measurement of the activity of the pathological processes. However, although the therapeutic experiment falls short of perfection, we regard our results as in all probability valid. They accord with the clinical impression gained from a larger series treated on similar lines which did not satisfy the rigid criteria for inclusion in the trial. Two of these cases, and one of the trial patients, showed a striking recrudescence of the disease on withdrawal of the drug. Another patient in the trial (one of the four C cases in the corticotrophin group) relapsed after initial improvement while still under treatment: outside the conditions of a therapeutic trial such a development might have been regarded as a signal for increased dosage.

Reviewing our patients as a whole we are especially impressed by the rapid improvement often observed in acute retrobulbar neuritis treated with corticotrophin. This may well be related to the special conditions associated with this lesion, in which the tension of inflammatory œdema in a nerve closely invested by its bony canal is dramatically manifested as acute failure of visual acuity. The relief apparently induced by the anti-inflammatory action of corticotrophin is often equally striking, though this is of course no more than clinical impression. Attention has already been drawn to the urgent need for a planned trial on these lines by ophthalmologists (Miller 1961).

Our observations lend further support to the view that inflammatory processes are involved in acute multiple sclerosis. With regard to practical therapy, to shorten an exacerbation (and that not invariably) obviously falls far short of effective treatment of the disease as a whole. Nevertheless there is clearly a case for treating acute attacks on the lines we have described.

Because it is a simpler and more convenient form of treatment, it would be agreeable to advise the substitution of prednisone for corticotrophin. In most branches of medicine these drugs are employed almost interchangeably, and authorities in this field of pharmacology seem to be nearly unanimous in regarding their anti-inflammatory properties (for which they are used here) as identical. In the present context, however, reservations are inevitable. As already mentioned, both Jönsson et al. (1951) and Alexander et al. (1961) regard the response to cortisone and prednisone as significantly inferior to that observed with corticotrophin. Furthermore Ross et al. (1958) have recently claimed that, far from sharing the well-authenticated efficacy of corticotrophin in inhibiting experimental allergic encephalitis, prednisone actually intensifies the pathological changes induced. This observation needs confirmation; but meanwhile such scanty clinical and experimental evidence as is available does not support a firm recommendation to substitute prednisone for corticotrophin in this sphere of neurology.

Summary

A controlled therapeutic trial of corticotrophin in acute exacerbations of multiple sclerosis has confirmed the clinical impression that the hormone exercises a favourable effect on the outcome of some such episodes. These results do not, however, necessarily imply the efficacy of prednisone by mouth.

We should like to thank the board of governors of the Royal Victoria Infirmary, the Multiple Sclerosis Society, and the North-East Multiple Sclerosis Trust for their generous financial support.

References at foot of next column

NEAR-AVULSION OF FOOT TREATED BY REPLACEMENT AND SUBSEQUENT PROLONGED EXPOSURE OF PATIENT TO OXYGEN AT TWO ATMOSPHERES PRESSURE

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THE result of replacement of a limb in man has rarely been reported. We believe that in the case described here the successful outcome was largely due to the early administration of oxygen under pressure.

Case-record

A 16-year-old youth was admitted to the hospital on March 27, 1961, within an hour after being involved in a motor-cycle accident. He had sustained a severe compound fracture-dislocation of the left ankle. The soft-tissue injury was extensive, with an almost completely circumferential bursting type of skin laceration extending backwards from a point 4 cm. above and anterior to the medial malleolus, behind the tendo Achillis and forwards on the lateral side to a point 2 cm. in front of the lateral malleolus. A bridge of skin only 4 cm. wide remained between leg and foot. Extensive friction burns were present on the posterior and antero-lateral aspects just proximal to the laceration, and there was a 5 cm. laceration over the lower third of the anterior compartment of the leg through which torn muscle had herniated. All the tendons in the ankle region were intact although some of those on the medial side had been partly torn from their respective muscles. The medial collateral ligament of the ankle-joint was completely disrupted and the lateral ligament was partially torn. The posterior tibial nerve appeared to retain continuity, but extensive intraperineurial hæmatoma indicated that this had suffered severe stretching. The anterior and posterior tibial vessels were completely torn across with retraction of the proximal and distal ends, and the branches of the peroneal vessels were similarly divided. Radiography revealed that the skeletal injury consisted of a comminuted fracture of the medial malleolus with gross anterolateral dislocation of the talus, which retained its normal relations to the rest of the foot.

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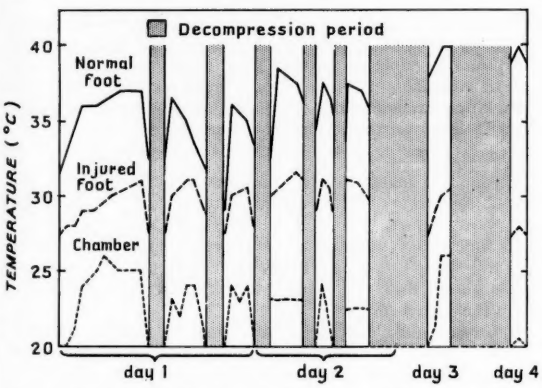

Fig. 1—Skin temperatures over dorsum of right and left feet compared with ambient temperature.

At first inspection the foot was white, cold, and devoid of sensation apart from an area of skin about $1^1/^2$ cm. in diameter over the base of the fifth metatarsal in which some pain sensibility persisted, presumably subserved by a branch of the musculocutaneous nerve contained in the small bridge of intact skin.

Operation

At operation the fracture-dislocation was first reduced, but this had produced no improved in the ischæmic foot after fifteen minutes. The herniated muscle in the leg wound was excised, and loose approximation of the skin edges only provided decompression of the anterior tibial compartment. Of the vessels around the ankle only the posterior tibial artery appeared suitable for attempted repair. After the ends of this had been isolated it was possible to carry out end-to-end anastomosis at a level 1 cm. proximal to the division into plantar arteries. Even then it was necessary to close a small lateral hole where a calcaneal branch had been torn off flush with parent artery. The arterial repair was effected between clamps with 5 zero arterial sutures, and despite the small calibre (about 3 mm.) a good pulsatile flow of blood was carried into the foot where the artery had previously been flushed out with heparinised saline solution. Further evidence of arterial inflow into the foot was afforded by the observation that blood began to ooze from the distal ends of some of the torn veins. After minimal debridemanet, the skin edges were loosely approximated and a copiously padded Kramer wire splint was applied with the foot at a right-angle to the leg. The soft-tissue damage to the leg precluded the use of anticoagulants, but venous flow from the foot continued and was allowed to drain into the dressings.

Oxygen Therapy

Four hours after the initial injury the patient was transferred to the compression chamber installed in this hospital where he breathed oxygen at 2 atmospheres pressure, and this regimen was continued for the next twelve hours. For the following eighty hours, treatment with oxygen under pressure was given for periods of two to five and a half hours at increasing intervals. Skin-temperature readings taken from both feet throughout this time, together with the ambient temperature, are shown in fig. 1, and they indicate that blood was still flowing into the injured foot. After three hours in the compression chamber the foot became pink, and it remained thus for forty hours except during periods of air breathing and decompression when the toes regularly became cyanotic. By the forty-third hour the ooze into the dressings had ceased, and the slow blood-transfusion given to compensate for this loss (estimated at 2 pints) was discontinued. Thereafter, the toes became dusky and congested, but intermittent pressurisation was continued for two more days after which the extent of skin viability appeared to be confined to the foot proximal to the web of the toes.

Second Operation

Coliform organisms were isolated from the wounds after one week and *Pseudomonas pyocyanea* was found a week later. However, there was no gross infection and the skin loss did not increase in extent. Thirteen weeks after the original injury the wounds around the ankle were well healed and the forefoot was removed through the tarsometatarsal joints by Mr. T. B. Gardiner, who reported that there was free bleeding at the time of section. Healing was satisfactory.

The present position is shown in fig. 2. There are a few degrees of movement at the ankle-joint, and, while there is some cutaneous hyperæsthesia, localisation of light touch is good. There is neither spontaneous pain nor pain on weight-bearing.

Discussion

Our experience with the anastomosis of small vessels, particularly after a tearing dehiscence, has been disappointing. The retention of patency is even more improbable when heparinisation is not possible, as in this case. This led us to consider the possiblity of keeping this foot alive by preventing anoxia, in the hope that collateral venous drainage would develop and new arterial channels

Fig. 2—Lateral view of healed amputation.

form before the reconstituted posterior tibial artery thrombosed. We believe that, as far as the continued viability of the heel and tarsus is concerned, this was achieved and was materially aided by increasing the amount of oxygen dissolved in the blood entering the foot and in the tissue-fluid of the near severed foot.

The gain here has been considerable since, instead of the below-knee amputation indicated by conventional treatment, the patient can walk normally wearing a lacing boot with a rubber forefoot block. No ill effects resulted from the prolonged high-pressure oxygen inhalation.

This case also emphasises the necessity of an adequate venous return since, after cessation of the oozing from the foot veins and the impairment of venous drainage, the condition in the toes resembled venous gangrene (Boyd and Smith 1956). The survival of poorly vascularised tissues is prejudiced by infection, and the prevention of this is of considerable importance.

Summary

A case of almost complete traumatic amputation of the foot with replacement and partial survival is reported.

Prolonged treatment of the patient with oxygen under pressure apparently had a considerable favourable influence on the outcome, without causing any ill-effects.

We wish to acknowledge the help and encouragement given by Prof. Sir Charles Illingworth and Prof. Roland Barnes.

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PREVENTION OF ANENCEPHALY AND FŒTAL ABNORMALITIES

BY A PRECONCEPTIONAL REGIMEN

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THE birth of a baby with anencephaly or other serious abnormality means that the pregnancy has failed. A second and, even more, a third failure will be extremely disturbing to the mother's physical and mental health. In this paper I describe a possible new approach to such cases.

The regimen proposed is designed in the first place to enhance male fertility. That this fluctuates is generally acknowledged by infertility clinics, which require abstinence from intercourse for at least five days before semen is examined. Because rest from intercourse produces a more fertile semen, I now recommend, in cases of infertility, that coitus should cease from the first day of the menstrual cycle to the eleventh.

Methods

Both partners are questioned on the frequency, technique, timing, and adequacy of intercourse. On the wife, a pelvic examination is carried out: lacerated cervix, congenital malformations, or other abnormalities are sought. Diabetes, syphilis, and Rh sensitisation are excluded. She is then given a lecture on the physiology of menstruation, ovulation, and coital technique; and ways of producing the maximum fertility in herself and in her husband are described.

A general examination of the husband is aimed in particular at excluding diabetes and syphilis. His blood-group is noted. In the genitalia, abnormalities such as phimosis, atrophied or undescended testis, varicocele, and hypospadias are looked for. His adolescence and early sexual experience are analysed, and he too receives a lecture on coital technique, male and female orgasm, and how to create the optimum conditions for fertility.

Preconceptional Regimen

A preconceptional regimen to enhance fertility (Cross 1953, 1954) is ordered:

(1) Rest from intercourse for as long as possible (at least ten days; better still, a month or six weeks), the rest to end on the day the wife ovulates.

(2) From the eleventh day of the menstrual cycle, intercourse as often as desired, for about four days to a week.

(3) No intercourse after this until the eleventh day after the beginning of the next cycle. The husband should take no hot baths and use no tight suspensory bandages.

(4) A diet rich in protein and phosphorus should be recommended.

(5) Supplemental vitamins A, C, and E should be taken in large doses, as well as iodised table salt.

Antenatal Routine

During pregnancy there must be no cycling, dancing, swimming, lifting of heavy weights, hair washing, or hot baths, and no intercourse (Cross 1946). Vitamin C 200 mg. is taken three times a day, vitamin E 70 mg. twice a day, and vitamin A 16.5 mg. twice a day. Each week I inject 2 ml. of a bismuth preparation ('Bisoxyl') (Cross 1946) and vitamin B_{12} 1000 mg. (until the 37th week).

If cervical deficiency is present a small 'Bakelite' ring is placed around the cervix and left in position (Cross 1959) until the 38th week.

Case	Age	Married (yr.)	Pregnancies	Live babies	Obstetrical history	Husband		Result of frequency after treatment
						Age	Intercourse (weekly frequency	
1	34	1½	3	0	2A	43*	14	Normal
2	22	3	3	0	2A	29	3	Normal
3	36	9	3	0	1A	40	3	Normal
4	37	3	3	0	2A	40	5	Normal
5	30	2	2	0	2A	30	21	Normal
6	33	2	2	0	1H	33	14	Normal
7	37	1½	1	0	1A	34	14	Normal
8	36	11	4	1	1N 1A 2Mc	38	4	Normal
9	24	1	1	0	1A	34	7	Normal
10	27	1½	2	0	2ABN	27	7	Normal
11	25	1	2	0	1Ab	27	7	Normal
12	33	5	2	1	1N	33	7	Normal
13	36	12	4	1	1N 2A 1Ab	36	4	Normal
14	28	3	2	0	2SB	29	5	Normal
15	25	1	1	0	1H with SB	28†	5	Normal
16 (Married twice)	(i) 24 (ii) 31	3	1 7	1 0	IN 1A 2Mc 4Ab	(i) 31 (ii) 28	1 7	Pregnant; due Dec. 18, 1961

A = Anencephalic
Ab = Abortion
ABN = Abnormal
H = Hydrocephalic
Mc = Miscarriage
N = Normal
SB = Spina bifida

* 1 atrophied testicle.
† Diabetic.

Results

The accompanying table shows that of 16 women treated in this way, 15 gave birth to a healthy normal child, and 1 is nearing the end of an apparently normal pregnancy after a very unhappy history in 7 earlier pregnancies.

Summary

16 women who had borne abnormal offspring were treated, with their husbands, on a regimen which included an enriched diet and absence from intercourse except at a specified time in the cycle. After they conceived, an antenatal routine designed to avoid dislodging the fœtus was followed; no intercourse was allowed, and no strenuous exercise.

15 have given birth to healthy live infants, and none is known to have given birth to abnormal infants.

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THE PREVENTION OF PRESSURE SORES

SIGNIFICANCE OF SPONTANEOUS BODILY MOVEMENTS

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MANY factors are involved in the causation of pressure sores. Some of these are clinical, and are related to the patient's physical and mental state. Others are concerned with the standard of nursing care, and include especially the measures used for the relief of pressure, the frequency of local applications to the pressure areas, the prevention of contact of urine with the skin in the case of incontinent patients, and the effects of humidity and of the material of the mattress, mackintosh and drawsheet. But, whatever be the relative importance of these factors, the fundamental cause of tissue damage is the pressure acting on the skin, subcutaneous tissues, and muscles; and compression is most severe in those areas underlying bony prominences.

The Effects of Pressure

In laboratory animals low pressures maintained for long periods are more damaging to the tissues than high pressures for short periods—i.e., the time factor is more important than the pressure intensity. In the muscle of the rat's leg a threshold of 100 mm. Hg for two hours must be reached to produce

definite microscopical changes, and the effects are similar to those produced by a pressure of 600 mm. Hg for one hour (Husain 1953).

In man, when standing, the skin of the soles of the feet tolerates compression which greatly exceeds the blood-pressure. The ischæmia produced by temporary obliteration of the blood-vessels is followed by reactive hyperæmia when the pressure is relieved; thus the skin of the foot is flushed with blood at each step or movement of the foot. Trumble (1930) has shown that a pressure of more than $1^1/_2$ lb. per sq. in. (about 80 mm. Hg) over a long period is likely to cause death of the skin. In health the tissues are not subjected to high pressure for long, because the discomfort which arises from compression of the skin and subcutaneous tissues readily initiates changes in posture with consequent relief from pressure.

In the normally active person the limit of tolerance to pressure is rarely exceeded; but in illness the protective mechanism may be ineffective or even abolished. Extreme weakness associated with a poor physical condition, apathy, clouding of consciousness, paralysis, or sensory disturbances may all lead to lack of response to stimuli arising from the area of skin which is compressed. We have therefore studied the spontaneous restless movements made by a group of elderly patients in hospital, and their relation to the production of pressure sores.

Methods

The Patients

The movements were recorded in 50 elderly patients newly admitted to the geriatric unit:

Their ages ranged from 65 to 93, the average age being $80^1/_2$ years. Although multiple pathological conditions were nearly always present, the principal lesion was in the central nervous system in 18 cases, the cardiovascular system in 14 cases, the respiratory system in 7 cases, the skeletal system in 7 cases, and in other systems in 4 cases. The majority of patients had long-term illnesses, but 21 were admitted with an acute exacerbation or an illness of less than six weeks' duration. Of the 50 patients, 30 were discharged home, 14 died, and 6 are still in hospital.

The Apparatus

The apparatus used is described by Sherwin, Exton-Smith, and Haines (1961). A movement made by the patient operates an inertia switch via a ratchet strip which is attached to the mattress. A small movement of the trunk operates the switch once or twice, but a larger movement sufficient to cause a complete change of bodily position may operate the switch as many as 12 times. The total motility score is recorded on a counter which is kept in the nurses' station.

The Records

Each study extended over seven hours from 11 P.M. to 6 A.M. Records were made on each patient on three to ten consecutive nights, and the pressure areas were inspected daily for evidence of developing pressure sores. In general those patients who showed a falling score were studied longer. It was seldom necessary to observe patients whose general condition was improving for more than five consecutive nights, and usually fewer recordings were sufficient.

Results

The average nightly score has been calculated for each patient from the records obtained on successive nights. The results are shown in the table, the patients having been placed in four groups according to their average score. Of the 50 patients, 10 had average nightly scores of less than 20, and in 9 of these pressure sores developed. Only 1 other patient had a pressure sore; although her average nightly score was 23, erythema of the pressure areas was noticed after the night when the score fell to 15, and two nights later, when the score was 7, a frank sacral pressure sore had appeared.

THE INCIDENCE OF PRESSURE SORES IN 50 PATIENTS, GROUPED ACCORDING TO NUMBER OF MOVEMENTS

Group	No. of patients	No. of movements		No. of patients with pressure sores
		Range	Group mean	
0–20	10	4–20	10	9
21–50	12	23–50	36	1
51–100	19	54–97	74	0
101+	9	110–225	162	0
Total	50	..	68	10

Discussion

Previous studies on the prophylaxis of pressure sores in 468 patients (Norton, McLaren, and Exton-Smith 1962) have shown that local applications to the pressure areas have little effect, even when the usual routines are combined with a policy of early ambulation and, whenever possible, the nursing of patients out of bed. Such measures are ineffective not only because some patients must be nursed in bed throughout the twenty-four hours but also because patients who are relatively immobile sustain by far the most serious tissue damage at night, when localised areas of the body surface may be exposed to great pressure over long periods. In a further 100 patients, in whom the routine for preventing pressure sores included regular turning in some cases as often as 12 times in the twenty-four hours, the incidence of pressure sores was reduced to a quarter of that in the larger series. This second study was made in a small ward with a high nurse/patient ratio, and it showed that pressure sores could usually be prevented even when the patient's general condition was very poor.

In certain special units—e.g., centres treating paraplegia due to spinal injuries—all patients nursed in bed are at risk since if pressure is not relieved by regular two-hourly changes of position, pressure sores will inevitably develop. But in geriatric wards, and indeed in many medical and surgical wards, such measures represent a counsel of perfection, because rarely are enough nurses available to undertake the routine turning of all patients. Our investigation indicates that many patients make spontaneous movements during sleep which change their own bodily position often enough to prevent tissue damage. Patients whose motility scores during a seven-hour period at night are consistently above 20 are unlikely to get pressure sores, and for these no special prophylactic procedures are needed. On the other hand, in those patients whose scores are less than 20 and those who show a rapidly falling score on successive nights, pressure sores are very likely unless active preventive measures are instituted.

The frequency of pressure sores increases with age; in the series of 468 patients, the proportion of pressure sores was nearly twice as great in those aged 85 or more compared with those under 75. It seems likely from our present study that about 20% of patients newly admitted to a geriatric unit are especially at risk, and for them the most skilled and careful nursing is required. A small ward of, say, 20 selected patients, with regular two-hourly turning, represents a practical possibility.

The incidence of pressure sores can be directly related to the patient's general condition as assessed by a simple scoring system which takes into account his physical and

mental state, his activity, his ability to change his position in bed unaided, and the degree of incontinence when this exists (Exton-Smith and Norton 1960, Norton et al. 1962). The influence of sedative drugs which diminish movements during sleep must also be considered. Much experience is needed in recognising on clinical grounds alone the individual patients who are particularly at risk; but we have shown that the patients who require frequent skilled attention to prevent pressure sores can be selected reliably from records of their spontaneous restless movements.

Summary

Long-sustained localised pressure is more damaging to the tissues than high pressure for short periods. In health the limit of tolerance to pressure is rarely exceeded, because discomfort from compression of the skin readily initiates changes in posture.

The incidence of pressure sores in a group of 50 elderly patients has been directly related to the number of spontaneous movements they made during sleep.

Patients whose motility scores are consistently high need no special nursing for the prevention of pressure sores. But those whose scores are low, or who show a rapidly falling score on successive nights, are very liable to pressure sores, and they require active prophylaxis.

We are indebted to the sisters and the nurses of the geriatric wards for their assistance in making the records, and to Dr. John Marshall, of the National Hospital, Queen Square, for his helpful comments.

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New Inventions

AN APPARATUS FOR RECORDING MOVEMENT OF PATIENTS IN BED

An apparatus which will record a patient's bodily movements has several practical uses. The measurement of restlessness during sleep has been used experimentally to assess the hypnotic effects of drugs. Hinton [1] has recorded the movements made by psychiatric patients after the administration of barbiturates, and Hinton and Marley [2] have compared the effects of meprobamate and pentobarbitone sodium. Their apparatus for recording motility was described by Cox and Marley [3]: vertical displacement of the bed spring at the levels of the hips and shoulders actuates a potentiometer from which the voltage differences are fed into an amplifying circuit, and the movements are registered on a counter and pen-recorder.

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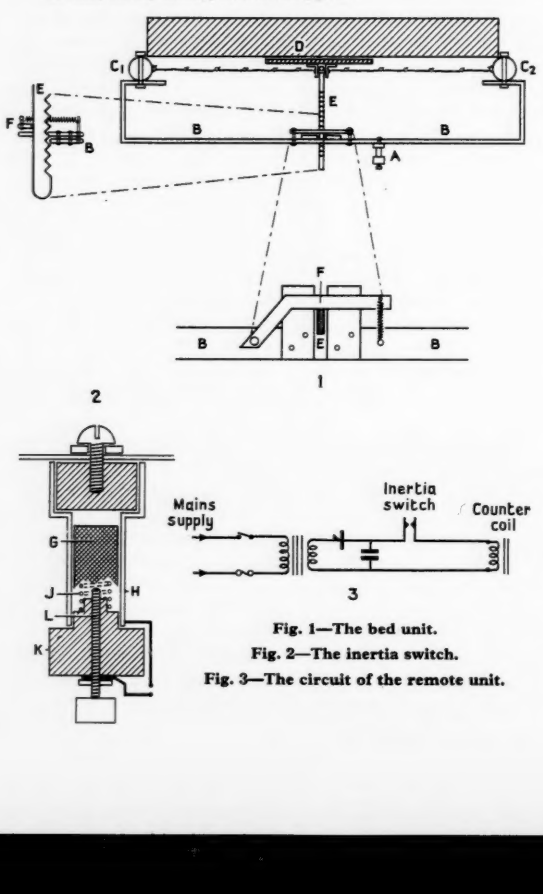

Fig. 1—The bed unit.

Fig. 2—The inertia switch.

Fig. 3—The circuit of the remote unit.

Our need for a simple apparatus to record patients' movements arose during a study of the factors responsible for the development of pressure sores in elderly patients in hospital.[4] Although many aspects of the patient's general condition may influence the formation of pressure sores, one of the most important factors is the lengthy period of pressure sustained by certain areas of the body due to immobility during sleep. We have recorded the movements made by elderly patients with various physical disorders, and investigated their relation

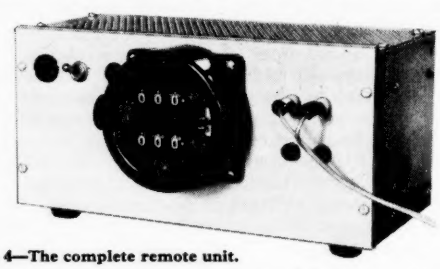

Fig. 4—The complete remote unit.

to the frequency of pressure sores.[5] After this experimental study the method was used in the assessment ward of our geriatric unit to indicate which patients are especially liable to develop pressure sores.

THE APPARATUS

The apparatus consists essentially of an inertia switch in circuit with an electrical impulse counter. Early in the study trials were made with the switch mounted directly on the underside of the mattess, and this provided satisfactory records of brief sudden movements. But, because the switch is actuated by acceleration rather than by velocity, slow and sustained movements of the type made by an apathetic patient turning over in bed were underestimated. Hence it was found necessary to operate the switch indirectly by means of a rack which causes the switch mounting to vibrate at a frequency proportional to the speed of the movement.

The apparatus may be considered as two units:

1. The bed unit, consisting of a switch and actuating assembly.
2. The remote unit—a transformer, rectifier, and counter which may be set up at any distance from the bed.

The Bed Unit

As shown in fig. 1, the upper end of the inertia switch (A) is bolted to the steel cross-strip (B), which in turn is bolted to the side members of the bed (C_1 and C_2) half-way between the head and the foot. The cross-strip is angled to allow about 8 in. clearance between the switch and the mattress. A 1 ft. square of wood half an inch thick (D) lies between the wire mattress and the soft mattress. A rack (E) is pivoted to the underside of the wooden square, and the teeth of the rack impinge on the cross-

4. Norton, D., McLaren, R., Exton-Smith, A. N. Investigation of Geriatric Nursing Problems in Hospital (to be published).
5. Exton-Smith, A. N., Sherwin, R. W. *Lancet*, 1961, ii, 1124.

strip (B). Apposition between the rack and cross-strip is maintained by a spring-loaded clip (F).

Fig. 2 illustrates the construction of the inertia switch. The central solid cylinder (G) slides inside the tubular casing (H). The cylinder rests on a coil spring (J), which is attached to the flanged wooden end-piece (K). A threaded adjustable bolt (L) passes through the end-piece, and when in the resting position it makes contact with the cylinder (G). Downward acceleration of the switch breaks the contact, and this is restored when the acceleration ceases.

The Remote Unit

Fig. 3 illustrates the circuit, and fig. 4 the complete boxed chassis. The counter operates on a 24-volt direct current, which is provided from the mains through a transformer and rectifier.

We are grateful to John Wyeth & Brother Ltd., for providing the recording apparatus, and to Mr. C. H. Walker, engineer, the Whittington Hospital, for his help in making the actuating assembly.

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Reviews of Books

Night Calls

A Study in General Practice. MAX B. CLYNE, M.D. Additional chapter by AARON LASK, M.R.C.S., D.P.M. London: Tavistock Publications. 1961. Pp. 216. 21*s.*

THIS is a record, with comments and conclusions, of a group-study by eight family doctors working with Dr. Michael Balint at the Tavistock Clinic. Their subject was, in effect, " calls out of hours " (between 7 P.M. and 7 A.M.), with particular attention to the relevant emotions, causal and consequential, in both patients and doctors. The doctors presented cases to the group, who then discussed them, including the presenting doctor as a part of the material. There is some statistical analysis of night calls, a verbatim account of a typical group discussion, and case-reports and comments in about equal measure. In a final chapter Dr. Lask reviews the whole undertaking and psychologically dissects the doctors—psychiatrist included. In a foreword Dr. Balint justly commends the frankness and objectivity of the book and asks the like of critics in return.

The fact that every clinical happening and every doctor-patient encounter has an emotional content and that emotion is a main or part cause of many disorders acute and chronic should, of course, be always present in the mind of every clinician. That psyche should be investigated and treated as fully as soma follows logically; but what does not follow is that in the interest of the patient either kind of investigation and treatment should be carried through to completion. Quite often it is best not to uncover the minutiæ of somatic illness and the same is surely true when psyche is to blame. Psyche is so omnipresent to these researchers that they feel it wrong ever to allow her to lurk in the wings or cover her nakedness, though quite clearly they do not feel the same about soma.

Thus, a patient (" the best sort of British working man ") is found rolling on his bed " in extreme agony " with pain in the back and knees. Long and patient listening uncovers a painful emotional situation including a back-breaking wife, yet " an injection " (unspecified) has still to be given " to relieve pain " before the doctor leaves, and afterwards a hospital is said to find a " slipped disc ". Is it not possible that though the hospital may have overlooked the wife, the doctor may have overlooked a physical lesion in the lumbar spine?

Another patient faints while his wife is dressing a boil on his leg, and the doctor, looking on faints as " total withdrawals", finds an adequate emotional situation but does not report whether the man was kept standing for the dressing, and if so for how long. If a young woman faints at a " prom " and presents with fear of heart-disease, does she not need the requisite physical examination, instruction on the physiology of faints, and what to do when the cold sweat begins, rather than, say, a search for painful associations in the slow movement of the symphony?

Practitioners will here find themselves and their patients depicted with truth and insight in familiar situations, and they may be made to feel that sometimes, at least, they have left undone those things which they ought to have done and that this was partly for lack of instruction in a suitable technique; but they are unlikely to feel they must alter their whole approach. The basic questions of how much psychiatry is called for from the family doctor, especially at night, and how far he should press it upon reluctant patients gets no convincing answer, and it is impossible not to feel that the psychiatrically oriented doctor is in danger of undervaluing the importance and the difficulty of " organic " diagnosis and treatment.

Introduction to Anatomy

A Facsimile Reproduction with a Translation and Introductory Essay. C. D. O'MALLEY, K. F. RUSSELL. London: Oxford University Press. 1961. Pp. 64. 15*s.*

TO a student at its outset, the five-year course for a medical degree seems long. Yet in the 15th century Cambridge University required a period of twelve years' study for a doctorate of medicine: and, paradoxically enough, only a sixth of this time was spent in the actual practice of medicine, and none at all in studying human anatomy. The eventual revision of the medical curriculum in England, and the introduction of a more practical training followed similar changes in Continental schools. (Dissections were performed with some regularity in Paris before 1477, and in Bologna fifty years earlier.) They were largely the result of the influence of an Oxford scholar, David Edwards, of Corpus Christi College. Though little known until now, it was he who performed, in 1531, the first dissection of a human body recorded in this country, and who wrote a year later the first anatomical text ever printed here.

Only one known copy of his book still exists, and it is this which is now reproduced in facsimile, with an annotated translation and an instructive introductory essay. The *Brief but Excellent Introduction to Anatomy*, as the work was originally called, may not have any remarkable intrinsic merit: but it is important as one of the first signs of the new experimental methods in science which were to follow. At the same time, it also indicates the control over men's minds which such authorities as Galen still exercised. For when its author encountered (as he did when examining the renal vessels) a state of affairs at variance with that previously described, he was quite willing to consider his own findings anomalous. Doctors and patients of a later day owe him, nevertheless, a debt for his concern over the education of " the very few unlearned physicians by whose mistakes many perish ".

Clinical Child Psychiatry

KENNETH SODDY, M.D., D.P.M., physician to the department of psychological medicine and lecturer in child psychiatry in the Medical School, University College Hospital, London. London: Baillière, Tindall, & Cox. 1960. Pp. 470. 42*s.*

Dr. Soddy's book combines the virtues of a roving and stimulating mind with no less than 95 detailed case descriptions derived from London child-guidance work. Concepts are broadly based and appropriately psychodynamic, but the book is rather loosely put together and contains no references to some of the important work on its subject. It is about children as Dr. Soddy sees them (and he sees them with much wisdom); and although it is the size of a textbook, it is more of an extended essay. Its series of clinical experiences cannot be said to take the place of the descriptive classification of which child psychiatry stands in need; but for what it does contain we may be grateful.

Strangulation Obstruction

ISIDORE COHN Jr., M.D., D.SC., professor of surgery, Louisiana State University School of Medicine. Springfield, Ill.: Charles C. Thomas. Oxford: Blackwell Scientific Publications. 1961. Pp. 273. 94*s*.

FOR rather more than ten years Dr. Cohn has devoted his time and researches to strangulation of the gut and possible causes for its mortality. In this monograph he reviews this work, much of which is based on animal experiments. After a useful preliminary review of the literature, the work unfolds in the order of events followed in his investigations. The reader thus has no difficulty in following his logic until a final picture is built up of a sequence of mechanisms in which the most important is an ultimate invasion of clostridia, escherichia, and streptococcus after multiplication in the lumen.

Guilty But Insane

Four Trials for Murder. G. W. KEETON, M.A., LL.D., professor of English law, University of London, principal of the London Institute for World Affairs, and Editor, *The Solicitor*. London: Macdonald. 1961. Pp. 194. 21*s*.

THIS well-written book outlines the progress of thought on murder and insanity and analyses in detail four famous trials—Hadfield, who was successfully defended just before the Insanity Bill of 1800; McNaughten, who caused the Rules; Straffen, the murderer who showed up the inadequacies of those Rules; and Podola, who nearly succeeded in a defence of unfit to plead on the grounds of hysterical amnesia. The gap between McNaughten (1843) and Straffen (1952) is not effectively bridged. As a history book that is always clear and rarely flags, the book is an excellent introduction to a complex subject; but the medical reader will be disappointed that Professor Keeton never comes to grips with the problems which current law and practice raise for the psychiatrist in the witness-box—and, of course, vice versa. Recent attempts to rethink the concepts of "criminal responsibility" are not discussed. Space devoted to the evidence on the timing of Straffen's third murder would have been better spent on the Podola trial, analysing how two thoughtful psychiatrists came to disagree so remarkably about the nature of hysterical amnesia. The author does not face up to the impossibilities of legal line-drawing in the present state of the mental sciences; and he seems fairly satisfied with the homicide law as it is. His is a less penetrating approach than that, for example, of Lady Wootton; but this is nevertheless a book to be recommended.

Physiology of the Digestive Tract

An Introductory Text. HORACE W. DAVENPORT, PH.D., D.SC., professor and chairman, department of physiology, University of Michigan. Chicago: Year Book Medical Publishers. London: Interscience Publishers. 1961. Pp. 221. 64*s*.

THE title states the fact, the subtitle the purpose, for this is a work written by a physiologist with the clinical student in mind. The facts are well supported throughout by experimental evidence, and a nice balance is maintained between the two. As might be expected of a physiologist, the author approaches the subject from a functional aspect rather than by systems; and the book is divided into three main sections—motility, secretion, and digestion and absorption. It will be particularly valuable to the postgraduate who wishes to restore his basic knowledge and inform himself of the latest developments.

William Harvey: Englishman

KENNETH J. FRANKLIN, D.M., D.SC., F.R.C.P., F.R.S., emeritus professor of physiology in the University of London. London: Macgibbon & Kee. 1961. Pp. 133. 18*s*.

MORE than three hundred years have now elapsed since William Harvey, much troubled by gout but with his intellect still undimmed in a venerable old age, at last succumbed to "the dead palsy which took away his speech". Historians of many nations still find a study of his life rewarding, and are still able to present, from time to time, information that casts new light upon his discoveries or how he came by them. Professor Franklin is the latest of these distinguished biographers, and he has followed his translation of *De Motu Cordis* with this scholarly portrait of its author. His book is, in part, an examination of Harvey as an individual. It is also a history of those hypotheses on the heart's action which Harvey's predecessors defended, and of the steps by which present-day views were established. One or two asides, on the contributions which cineradiography and high-speed photography have made, show how those views are still changing.

Someone To Turn To

A Description of the Remedial Work of the National Marriage Guidance Council. London: Routledge & Kegan Paul. 1961. Pp. 111. 7*s*. 6*d*.

MANY kinds of work formerly done by unpaid volunteers have been taken over by professionals; and it is often stated that the well-meaning amateur now has little place and little value. Yet the Marriage Guidance Council is a big success, helping to fill a great need, and most of its work is done voluntarily. The explanation may lie, as suggested by Prof. François Lafitte in a foreword to this book, in careful selection and careful training. How the Marriage Guidance Council does this, its guiding principles and their development, and a description of the counselling that is done, form the substance of this book. It originally appeared as part I of *Marriage Counselling* published in 1958. Minor alterations have been made in the text to bring it up to date.

Particularly interesting is the description of how the Council has grown from the original group, who had only a conviction that the rapidly increasing divorce-rate was a social and personal disaster, and who were determined to find some way to prevent or lessen it. The fact that they did not set out with any fixed idea of how the task was to be done, that they included people of all professions concerned with marriage, and that they were prepared to develop along the lines suggested by experience, seem to have been the vital factors in the success of the Marriage Guidance Council. Since its very small beginnings, many doctors have had cause to be grateful to the Council and have to referred patients to it. The book will be of value to them and anyone else who is interested in marriage and human relations.

Somatic Stability in the Newly Born (*A Ciba Foundation Symposium*. London: J. & A. Churchill. 1961. Pp. 393. 50*s*.).—Homœostasis in the newborn animal is a subject of topical interest to many workers—from clinicians concerned with the survival of human or other mammalian infants to scientists of many kinds who find fundamental and peculiar problems related to this critical phase in the life of any living organism. It is a pleasure therefore to welcome the speedy and excellent publication, under the editorship of Dr. G. E. W. Wolstenholme and Miss Maeve O'Connor, of the proceedings of this symposium held last January and attended by 30 distinguished doctors and other scientists. Nutrition, temperature regulation, renal function, and the development of the nervous system were the main items discussed, together with the metabolic aspects of birth asphyxia and the respiratory distress syndrome (the clinician will be specially interested in the contributions of L. S. James and R. H. Usher on this syndrome). This is essentially a book for those whose minds follow Prof. R. A. McCance, the chairman of the symposium, in seeking to discover the "reason behind everything in Nature". The research-worker will be grateful for the succinct presentations, the stimulating discussions, and the useful bibliographies.

Abdominal Operations (4th ed. London: H. K. Lewis. 1961. Pp. 1402. 210*s*.).—Mr. Rodney Maingot's work is a flower of British surgery which seems to bloom perennially, though in fact the last edition was seen six years ago. As the years have gone by the bloom has grown and improved with the aid of an increasing number of illustrious contributors and some cross-fertilisation from overseas. The present specimen now thrives as a result of weeding, a little pruning, and resetting; there are almost 1000 new illustrations.

THE LANCET

LONDON 18 NOVEMBER 1961

Halothane

TODAY, five years after its introduction, halothane is a popular anæsthetic drug though the pharmacological evidence of its superiority to other agents is equivocal. There have been few controlled studies of its clinical usefulness, and there is frequent comment in hospital committees about its cost.

In the laboratory halothane has been found [1] to be extremely soluble in the body-fat; but this is so poorly vascularised that even after lengthy anæsthesia with the drug its tension there does not reach a high level. Consequently when its administration is discontinued the blood level falls quickly and the drug is rapidly cleared from the brain; recovery of consciousness or near-consciousness is therefore prompt. Halothane does not upset metabolism [2 3] as do ether or chloroform, nor hepatic function [4 5] as does chloroform. These are its main virtues in the laboratory.

On the reverse side it can reduce respiratory exchange both in laboratory animals [6] and in man,[7] thus causing carbon-dioxide retention. It has three seemingly undesirable actions on the circulation. First, it increases vagal activity, thus tending to cause cardiac inhibition [8 9] (the importance of this point may have been over-emphasised in the early papers on the drug [10]). Secondly, it sensitises the myocardium to adrenaline [11] and thereby predisposes to ventricular arrhythmias. Lastly, it often lowers the blood-pressure. Ganglionic blockade of various kinds,[11] a direct depressant action on the smooth muscle of the arterioles,[12] direct myocardial depression,[13] and an action on the central vasomotor mechanism,[14] have all been suggested as a cause of this last feature; but none of these factors has been shown to be solely responsible. It is, however, agreed that the hypotension of halothane is associated with vasodilatation and need not, except at extremely low levels of blood-pressure, cause tissue anoxia.[10 15]

Two safety mechanisms are built into the pharmacological action of halothane on the cardiovascular system. First, this agent does not increase the release of catecholamines from the suprarenal as do ether, chloroform, and cyclopropane.[16] Thus, though halothane can cause quite considerable carbon-dioxide accumulation, this is much less likely to result in serious cardiac irregularities than a similar accumulation due to the older agents. Secondly, as cardiac irregularities are less likely when the blood-pressure is low,[17] the hypotensive action of halothane protects the patient somewhat against dangerous ventricular arrhythmias. But this protection is by no means absolute, and adrenaline should never be injected without good cause into the patient under halothane.

In clinical anæsthesia halothane is valued as a non-irritant, non-explosive agent. It is popular primarily because it is easily administered and with it the resistant patient is readily controlled. It does not, however, produce abdominal relaxation comparable to that obtainable with ether or chloroform. It is useful rather for operations on the head, neck, extremities, and body surface, particularly when the diathermy apparatus is being used to arrest bleeding. It is given alone or more usually as a supplement to nitrous oxide and oxygen—though some feel that the former method is safer.[10] Its hypotensive action, if kept within bounds, can, provided build-up of carbon dioxide is avoided, make the operation area less vascular and reduce blood-loss. The satisfactory use of halothane in this way calls for more skilful observation of the patient than is necessary with many other techniques; but this is by no means beyond the capability of a conscientious junior.

The place of halothane in certain special branches of surgery has now been more or less clearly defined. It relaxes the parturient uterus [18–20]; and therefore its use in operative obstetrics, where there is a risk of post-partum hæmorrhage, is dangerous. It passes across the placental barrier to the fœtus and depresses its respiratory centre significantly [21 22]; for this reason its administration immediately before delivery may also be undesirable. By contrast it is especially useful in children, who tolerate well depression of sympathetic activity. Halothane can therefore be safely administered to children [23] in relatively large doses, and indeed this drug may be the agent of choice for short pædiatric surgical procedures. Given from a calibrated vaporiser, it is certainly safer, and infinitely easier to administer, than the time-honoured ethyl-chloride ether sequence. In neurosurgery the routine use of halothane for intracranial operations in which the brain bulk must be kept to a minimum is not acceptable to some, who fear that the vasodilatation to which it gives rise may increase the cerebral blood-flow and thus raise the intracranial tension.[24] It must be used with great caution during

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percutaneous cerebral angiography, because the carotid artery may be difficult to define if the pressure within it is low. On the other hand the vasodilator action of the drug might be expected to abolish cerebral vasospasm and improve the circulation to damaged parts of the brain.[25] There is certainly a place for halothane in the deliberate induction of hypotension in neurosurgery. Its vasodilator properties can also be utilised to increase the rate of heat exchange during induction of hypothermia.

The vasodilator action of halothane may prove useful in the treatment of shock. Certainly administration of ganglion-blocking agents combined with massive blood-transfusion has revived many apparently moribund patients [26]; and halothane, too, may be found to eliminate the possible adverse effects of the extreme vasoconstriction associated with severe shock. Halothane also already has some reputation as an anæsthetic for the prevention of shock,[15] perhaps because, by lowering blood-pressure, it diminishes bleeding. But this will happen only when there is no simultaneous respiratory depression and no carbon-dioxide accumulation to produce the reverse effect. There is another aspect of the value of halothane in the prevention of shock. Patients under its influence become profoundly hypotensive after the sudden loss of comparatively small amounts of blood, and exact replacement of blood lost is particularly necessary where this agent is in use—a factor which may have some bearing on the conspicuously good postoperative condition of patients to whom halothane has been given.

Though there are still differences of opinion concerning the pharmacological action and clinical use of halothane, the conflict concerning the techniques of its administration seems to have been resolved. Early workers used it in the ordinary Boyle bottle with a standard Magill attachment, and obtained reasonably reproducible results.[8 9] This method, however, was expensive. Subsequently halothane was successfully used in a closed circuit with the vaporiser outside.[9] On a-priori grounds it seemed that the use of so volatile an agent with the vaporiser inside the circuit would be dangerous; and this seemed to be proved by a few accidents [27–29] which befell patients to whom the drug had been administered in this manner. It was therefore with surprise, if not with frank disbelief, that anæsthetists read of a series of 1500 cases [30] in which halothane had been given safely by a closed-circuit method with the vaporiser in the circuit. Further consideration revealed two points. First, the uptake of the drug by the body-fat allowed an appreciable amount of the halothane picked up by the expired gases from the vaporiser to pass right out of the blood-stream without seriously altering the concentration of the drug there.[31] (An uptake of 15 ml. of halothane vapour per minute for each 1% of alveolar concentration of the drug was used by the Cardiff workers [32] in calculations concerning the closed circuit.) Secondly, it became apparent that the respiratory centre could act as a homœstatic mechanism to keep the halothane concentration in the blood constant. The repiratory depression produced by too high a concentration of the drug so reduced the minute volume, and therefore the flow of gases through the vaporiser, that the rate of uptake of the agent there fell below the rate of its escape from the blood-stream into the fat. Provided respiration was not assisted it was therefore impossible to overdose the patient if the vaporiser was so designed that it did not volatilise too large an amount of the drug. (This was no new discovery. The principle of using the respiratory centre to control the depth of anæsthesia had been utilised by FALKNER HILL some twenty-five years earlier in his bubble-bottle apparatus.) As a result of this work is has now been accepted as unwise to augment depressed respiration due to any high concentration of halothane, however administered, without at the same time reducing the concentration of the drug in the inhaled gases, lest the depression should be protesting the patient from overdosage.

25. Johnstone, M. *Anesthesiology*, 1961, **22**, 591.
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World Population

THERE are 3000 million people on Earth; and HUXLEY [33] says that, unless meanwhile there is catastrophic destruction, there will be 6000 million by the end of the century. Efforts to industrialise the underdeveloped countries, as an escape from the threat implicit in expanding population and stationary or slowly expanding food-supplies, will be defeated if the birth-rate is too high; for in this event capital and human energy must be concentrated on feeding, housing, and rearing the people of the over-fertile countries, which can never break through to advanced industrialisation. It is thus not surprising that Governments of some countries with existing or impending nutritional problems should be exploring ways of retarding population growth; and, according to HUXLEY, six such countries already have population policies, which in some cases have been reasonably successful. But, as PARKES has remarked,[34] the established methods of fertility control are a disgrace to science in this age of spectacular achievement. He suggests that the best hope of a simple and effective means of controlling fertility lies in immunising the female against spermatozoa, and that contraception is morally permissible up to the time when the fertilised egg is implanted. A particularly interesting line has been opened up by the observation that newly mated female mice display " block " to pregnancy if exposed to the smell of alien males from a different strain. As PARKES remarks, the idea of a contraceptive perfume is no longer quite incredible.

In this country the Family Planning Association [35] has decided that the evidence now suffices for general use of oral contraception,[36] with safeguards, in the female.

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35. *Lancet*, Oct. 14, 1961, p. 886.
36. See *ibid.* 1961, i, 1297.

Doubts may remain in some minds concerning widespread oral contraception, not only because intolerance of side-effects is sometimes a source of failure, but also because of the fear that long-continued suppression of ovulation may be harmful. (In rats suppression for two-thirds of the life-cycle may produce pituitary adenomas.[37]) There is much to be said for PARKES' suggestion that, if a corresponding inhibition of spermatogenesis could be achieved by non-steroidal compounds—and results so far are encouraging—husband and wife might take turns at consuming pills for a year at a time, so reducing the risk of adverse effects in either sex through indefinitely prolonged treatment.

In the latest account of contraception by oral norethynodrel, also from Puerto Rico, COOK et al.[38] report a failure-rate of only 2·1 per 100 couples per annum: indeed, no woman who followed the instructions conceived during a total of 515 woman-years of use. Of the 11 pregnancies in the 550 women included in the study, 4 had started before the norethynodrel was begun, 3 more occurred when the woman waited longer than the prescribed ten days for return of menses, and 4 followed failure to take the tablet daily. The pre-instruction rate in the community was 110 pregnancies per 100 years of exposure; whereas in the study the overall pregnancy-rate (including those who discontinued treatment) was 17 per 100 years of exposure. With norethynodrel there remain the disadvantages of "benign but unpleasant" side-effects, recorded in 18% of all cycles and mentioned at least once by 71% of the 550 users. True, such side-effects tend to decrease with persistence; but they can occur even after thirty months of trouble-free use. "Dangerous" side-effects have so far been absent. Carcinoma-in-situ was reported in 1 patient; and in another, who was 46 when she entered the trial, stage-2 carcinoma of the cervix developed. 2 carcinomas in a group of this size is well within the limits of chance.

Other side-effects reported, though classed as benign, are important. When, after even two years, the norethynodrel was discontinued the subsequent pregnancy-rate was 79%. Nevertheless, during the trial 43% of the women had a reduced menstrual flow. Prolonged use of progestogens may possibly result in permanent endometrial atrophy: temporary changes have already been demonstrated. Another source of anxiety is the increased prevalence of cervical erosion, which after an average of one year's treatment was present to a minor degree in 48% of 114 women, and to a severe degree in a further 22%. Contact bleeding after coitus or pelvic examination was reported in 5% of all patients; and in 40% of those followed up erosions became worse. COOK et al., therefore, recommend pelvic examination every year for women taking norethynodrel. The possibility of congenital malformation of a fœtus conceived after norethynodrel treatment was carefully assessed, and there was no evidence of a higher prevalence than normal; but a chance conception might arise through failure of correct dosage and, before its existence was realised, norethynodrel might again be resumed—already 3 cases of virilisation of the fœtus from norethynodrel have been recorded elsewhere.

While interest now centres mainly on oral contraception, efforts are still being made to develop a simple and safe contraceptive technique that is related in time to coitus; for one possible cause of failure of oral contraception is forgetfulness of the need for daily intake of a substance not immediately related to sexual union. PANIAGUA et al.[39] have tested a contraceptive foam which does not deteriorate in the hot moist climate that prevails in most areas where population increase is sharpest. No preliminary gynæcological assessment is needed; and the intervention of a physician or nurse is unnecessary, the instructions being extremely simple. In Puerto Rico, over a period of twenty-seven months 142 couples were introduced to the use of this foam. 69% accepted it, and among these a pregnancy-rate of 80 per 100 couples per annum before the trial was reduced to one of 29 per 100—a failure-rate which is within the range reported in the same area following the use of other methods involving more instruction and supervision. Since withdrawals were few, this method is apparently acceptable; and a much larger study of it is now in progress. But, though a threefold reduction in total conceptions may be regarded as demographically satisfactory, it is clinically much inferior to that provided by oral contraception.

Comparison of these two field studies suggests that acceptability, including "benign" side-effects with oral norethynodrel (which are absent with the foam), must be weighed against efficacy. The efficacy of the foam is far less than that of the pill, but demographically its efficacy cannot be ignored; and the simplicity of this method, which involves very little instruction and no medical follow-up, justifies extended trials, possibly with norethynodrel as an alternative for those who are capable of using it intelligently and who experience side-effects. Even if a safe and simple method can be selected for general use, much effort and much money will still be needed to inform those concerned of its possible value and on how to apply it—a fact of which Dr. SEIN, writing of India, reminds us on p. 1140.

Hospital Staffing

WHEN the Platt report appeared, too little notice was taken of its recommendation that hospital boards should review their senior establishments and make proposals for whatever new consultant or other appointments they require. Now that the Government have accepted the report in principle, this important review can soon begin (see p. 1153). On "the precise type of intermediate grade that may be required, its extent, title and salary", the representatives of the profession have not yet committed themselves. But the decisions finally made on the staffing of hospitals will have big implications for the future of general practice; and some of these need further thought before action is taken.

37. Report of Medical Advisory Committee of Family Planning Association. *ibid.* 1960, ii, 256.
38. Cook, H. H., Gamble, C. J., Satterthwaite, A. P. *Amer. J. Obstet. Gynec.* 1961, **82**, 437.
39. Paniagua, M. E., Predras, R., Vaillant, H. W., Gamble, C. J. *J. Amer. med. Ass.* 1961, **177**, 125.

Annotations

NOT NEARLY ENOUGH

SOME weeks ago Sir Zachary Cope, as president, appealed to us all for money which the Royal Medical Benevolent Fund could distribute at Christmas. Anyone who knows about the poverty in which some of the Fund's recipients are living will want to help them, even temporarily, at a time when so many other people will be enjoying so much.

But there is something more which each of us ought to consider. As Dr. T. Anwyl-Davies, the hon. secretary, says in the annual report,[1] " it is not generally known, even among friends and neighbours, what incredibly bad fortune and wretchedly poor circumstances some doctors and their families have to endure "; and (though he does not say this) the grants or annuities the Fund can give are all too often small in relation to what money will buy nowadays. Mr. R. M. Handfield-Jones, chairman of the management committee, has compiled a history of the Fund since it started in 1836, and we can scarcely be proud that this records " a long struggle against indifference among our own profession, an infinitely slow building up of capital investments, and the continuing agonising efforts to raise money ". That the Fund has now succeeded in building up considerable capital reserves may be, paradoxically, one reason why some people no longer think it needs support; but a charity may not feel justified in using its capital for current expenditure, or in diverting ordinary legacies to that purpose; and in point of fact the R.M.B.F. depends on its investment income for over two-fifths of what it gives away.

At present only an eighth of doctors on the Medical Register in this country are direct subscribers to the Fund; and even those of us who do subscribe ought to ask ourselves whether in 1961 or 1962 our subscriptions are still realistic, and if not, whether we could make them more. What we are giving, as a profession, is not nearly enough.

POST-BULBAR DUODENAL ULCER

THE clinical diagnosis of duodenal ulcer can never amount to more than a shrewd suspicion, and the common cause of preoperative failure to diagnose this disorder is failure to display its site radiographically in such a way as to make recognition possible; less often it is due to failure to recognise an ulcer when it has been displayed. Surgical exposure of the duodenum to direct inspection may not be easy, and palpation of an ulcer on the posterior or medial aspect of the post-bulbar region of the duodenum may be virtually impossible. Moreover, the surgeon may be loth to open the duodenum in a speculative search for an ulcer. Graham [2] referred to these post-bulbar ulcers as at times surgically " occult " and described a case in which three negative laparotomies preceded the correct diagnosis. His experience is by no means unique.

Post-bulbar duodenal ulcers formed 5% of all duodenal ulcers in Portis and Jaffe's [3] large series of necropsy records. Such ulcers may occur at the apex of the conventional duodenal cap, at the genu where the first and second parts of the duodenum are in continuity, and more rarely in the second or third parts of the duodenum. Many workers have referred to the unusually high proportion of men affected.[4 5] Back pain may be a feature,[6 7] and this may be so severe that lumbar myelography is undertaken in the expectation of finding a disc protrusion. Hæmorrhage is a commoner complication than in ulcers of the duodenal cap; Barton and Cockshott [8] encountered this complication in just over half of their 53 patients, and Swarts and Rice [5] found it recorded in 60% of 80 collected cases. Duodenal stenosis, evinced by vomiting, may be encountered.[7 9] Free perforation into the abdominal cavity is rare; but perforation may occur into the common bile-duct, as in one of Barton and Cockshott's [8] cases.

Suspicion of the presence of a post-bulbar duodenal ulcer should be aroused by the triad of severe dyspeptic pain with or without complications, repeatedly negative barium-meal reports, and negative laparotomy findings; and radiological investigation should then be especially directed to its exclusion. This is not always easy since the patients are often of generous build, and the post-bulbar part of the duodenum commonly lies behind the posteriorly directed duodenal cap. An exacting examination is then required of an area which is visible only through the transverse diameter of the patient at the level of possibly thickest body section. Careful search may be rewarded by a discovery which explains the patient's symptoms and directs the surgeon's exploring fingers to their relief.

MAST CELLS AND BASOPHIL LEUCOCYTES

Paul Ehrlich discovered the mast cell while he was still a medical student: some years later he also described the basophil leucocyte. He believed them to be two distinct cell types, one developing from perivascular mesenchyme and the other in the bone-marrow. This view was hotly disputed; but finally the argument was settled in Ehrlich's favour, notably by the work of Maximow. Since then functional and morphological similarities have been detected in the two cells which would have surprised their original discoverer.

Ehrlich called them first type *Mastzellen* (*Mast* meaning beech-nut, acorn, or other fattening fodder) because he thought that the cells were concerned with the nutrition of connective tissue. They contain basophilic, metachromatic, water-soluble granules whose nature long remained unknown. Indeed the cells themselves have been unfamiliar to most doctors other than pathologists and dermatologists. Dermatologists know of them because of their regular occurrence, sometimes in great numbers, in certain rare disorders of the skin—notably urticaria pigmentosa. This disorder is distinct from ordinary nettlerash. In the adult it manifests itself as small flat brown spots on the trunk or limbs; when rubbed, the spots become swollen and red, like bites or stings. This suggested the release of histamine from the lesions, and

1. This includes a banker's order and also a bequest form. Forms for seven-year covenants, which enable the Fund to recover income-tax, may be had from the office, R.M.B.F., 37, St. George's Road, Wimbledon, London, S.W.19 (tel: Wimbledon 1792). Christmas gifts (marked as such on the envelope) should go to the Fund at that address.
2. Graham, R. R. *Amer. J. Surg.* 1938, **40**, 102.
3. Portis, S. A., Jaffe, R. H. *J. Amer. med. Ass.* 1938, **110**, 6.
4. Ramsdell, J. A., Bartholomew, L. G., Cain, J. C., Davis, G. D. *Ann. intern. Med.* 1957, **47**, 700.
5. Swarts, J. M., Rice, M. L., Jr. *Gastroenterology*, 1954, **26**, 251.
6. Samuel, E. S. *S. Afr. med. J.* 1952, **26**, 121.
7. Cooke, L., Hutton, C. F. *Lancet*, 1958, ii, 1039.
8. Barton, C. J., Cockshott, W. P. *Brit. J. Radiol.* 1961, **34**, 216.
9. Paterson, D. E., Hancock, D. M. *ibid.* 1958, **31**, 660.

hence from their constituent mast cells. We now know that there is a close correlation between a tissue's content of mast cells and of histamine; and in animals to which histamine liberators have been administered the œdema is greatest where mast cells are most abundant. Using fluorescent histamine liberators, such as stilbamidine, Riley [1] showed that these were concentrated in the mast cells before their granules were disrupted. In addition, urticaria pigmentosa has been reported in patients who suffered from attacks resembling those of histamine shock, and high levels of histamine have been found in their blood.

The granules of mast cells also contain heparin, which in fact accounts for their basophilia. Good correlation between the heparin and mast-cell content of tissues has been demonstrated—spectacularly in the case of mast-cell tumours, which are not very rare in the skin of various domestic animals. One mast-cell tumour of the skin in a dog contained more than fifty times the amount of heparin in the dog's entire liver—and in the dog the liver is unusual in containing numerous mast cells. This state accounts for the fact that in the dog, but not in other species, peptone or anaphylactic shock is accompanied by incoagulability of the blood. In several species anaphylaxis is accompanied by degranulation of mast cells, and, although both heparin and histamine might theoretically be released from them, it is only in the dog that the heparin seems to reach the circulation.

What of the functional significance of the basophil leucocyte of the blood? As with the mast cell, the basophilia of its granules has been shown to be due to the presence of heparin; but, although this obviously suggests that these cells have a role in the prevention of thrombosis, there is no evidence for this. Indeed no definite function can be attributed to the heparin in them. In man the highest counts of blood-basophils are found in chronic myeloid leukæmia, and high levels of blood-histamine are characteristic of this disease—which suggests that the basophils make or carry histamine. Several studies showed that blood-histamine levels were directly related to basophil-counts, and Graham et al.,[2] by centrifuging blood to separate the various cell types, found that 90% of the blood-histamine was present in the basophil leucocytes. Histamine is released when blood is allowed to stand, when it clots, or when an antigen-antibody reaction is brought about. Shelley and Juhlin,[3] bearing in mind that the blood-basophil was the carrier of histamine, which was released in anaphylaxis, sought to show that in man the basophil was degranulated by antigen-antibody reactions. In this they succeeded, and they suggest that this feature may provide a reliable in-vitro test for anaphylaxis in man.

They use heparinised blood taken in a silicone-coated syringe. This is mixed with a standard quantity of antigen and is then fixed and filtered through a cellulose membrane. The filtrate is stained with toluidine-blue, and the basophil leucocytes can then easily be detected. Degranulation of 50% is regarded as significant.

Each of five patients with a history of penicillin anaphylaxis showed positive basophil reactions. Only five of fifteen cases with a history of urticaria associated with the use of penicillin gave positive reactions; but, as Shelley and Juhlin say, " penicillin urticaria " is a mixed bag and by no means all supposed cases of it are due to hypersensitivity to penicillin. Of the controls, all of whom had had penicillin in the past without clinical signs of intolerance, none gave a positive reaction.

This interesting observation deserves elaboration. Clearly the test has limitations, particularly since some drugs which might be used as test antigens are in themselves histamine liberators and may presumably degranulate basophils. But the method should be studied further, because we lack safe and reliable tests for anaphylaxis, and much of our ignorance of the mechanism of anaphylaxis can be attributed to this lack.

1. Riley, J. F. The Mast Cell. Edinburgh, 1959.
2. Graham, H. T., Wheelwright, F., Parish, H. H., Marks, A. R., Lowry, O. H. *Fed. Proc.* 1952, **11**, 350.
3. Shelley, W. B., Juhlin, L. *Nature, Lond.* 1961, **191**, 1056.

MERALGIA PARÆSTHETICA

A SYNDROME of burning pain and numbness down the lateral aspect of the thigh was first described by Bernhardt [1] in 1895, and was given the name " meralgia paræsthetica " by Roth [2] in the same year. Ghent [3] has done a useful service in drawing attention to the commonness of this condition, and to the variability of its clinical presentation. The symptoms are often wrongly attributed to intervertebral-disc disease, to osteoarthritis in the hip-joint, or even to more serious causes.

The condition is due to compression or irritation of the lateral cutaneous nerve of the thigh at or near the inguinal ligament, and, as Ghent [3] points out, four different anatomical variations in the course of the nerve may be found in such cases. In one it passes through a " split " inguinal ligament; in another it passes beneath the ligament but is then kinked over a sharp ridge of iliacus fascia just distal to the ligament; in the third type it passes through the belly of the sartorius muscle; while in the fourth the nerve crosses the iliac crest in a superficial position, where it is easily compressed by encircling garments.

In its commonest form the condition gives rise to an unpleasant aching or burning pain, often with tingling or other paræsthesiæ, which spreads down the lateral aspect of the thigh from just below the inguinal ligament to an inch or two above the lateral aspect of the knee-joint. Almost invariably the condition is most severe after standing for some time; and the skin of the affected area feels numb, though occasionally, when touched, it is hypersensitive, and stroking the area gives rise to unpleasant paræsthesiæ. Cutaneous hypalgesia and hypæsthesia can generally, though not always, be demonstrated. In a small proportion of cases the pain is continuous and excruciating, and interferes with sleep and with walking. The patient may have a distinct limp, though genuine associated muscular weakness is never found. Sometimes the symptoms are bilateral.

The syndrome is particularly common in obese patients and during pregnancy, and occasionally it develops during long-continued recumbency. Usually it constitutes no more than a minor nuisance, and no action is needed beyond assuring the patient that his symptoms are not serious and explaining their origin. When symptoms are more troublesome, permanent relief can sometimes be obtained by means of two or three injections of local anæsthetic around the lateral half of the inguinal ligament. Occasionally, symptoms are so severe and intractable as to warrant surgical treatment. When the anatomical cause of compression of the nerve is clearly demonstrated, following a transverse incision through skin and fascia

1. Bernhardt, M. *Neurol. Zbl.* 1895, **14**, 242.
2. Roth, V. K. *Med. Obozr., Mosk.* 1895, **43**, 678.
3. Ghent, W. R. *Canad. med. Ass. J.* 1961, **85**, 871.

lata below the lateral part of the inguinal ligament, simple decompression may give lasting relief; but if the nerve appears to have been irreparably damaged by pressure, section of it above the level of the inguinal ligament is usually advisable. Sometimes, in cases which fail to respond to decompression, nerve section at a second operation is necessary.

PRIMARY DRUG RESISTANCE IN TUBERCULOSIS

IN view of the importance of drug resistance in the treatment of tuberculosis, studies of its prevalence have been surprisingly few and limited. Fortunately, the need for fuller information is now being recognised. In general, resistance reflects on the standard of tuberculosis management. Either the drugs used have been ill chosen or their acceptance by the patient has not been secured—a fault especially associated with outpatient treatment, although not entirely absent in hospital. It is reassuring that Thomas [1] finds the prevalence in treated patients decreasing in this country.

Primary drug resistance in untreated patients is due to infection with resistant organisms, and it presents an epidemiological as well as a therapeutic problem. In Britain the first extensive survey of the three major drugs was carried out by Fox et al.[2] in 1955–56. In a report prepared by Dr. J. Marks, the Public Health Laboratory Service [3] has now recorded a similar study made in 1960. The following results for England and Wales show that little improvement has taken place in the interval:

Drugs	*Prevalence (%) of primary resistance*	
	1955–56	*1960*
Streptomycin	1·8	2·1
P.A.S.	1·8	1·0
Isoniazid	0·6	1·0
One or more	3·4	3·1

One noteworthy change is a considerable decrease in the prevalence of resistant organisms in young women.

The prevalence of primary resistance must be considered in planning the treatment of new patients, who normally require two effective drugs. Primary resistance to more than one drug is relatively uncommon; it was found in only 0·5% in 1955–56 and 0·7% in 1960. Consequently there is little risk of an effective drug being left unsupported if the three major drugs are prescribed together, which Crofton [4] recommends for new cases of any severity pending the results of sensitivity tests. For patients known to have been exposed to drug-resistant organisms and those who have previously had irregular or ineffective therapy, treatment must be planned with special care. With these precautions the prognosis with primary resistance is usually good; for such patients evince severe lesions, poor immunity, or uncooperative behaviour less often than those whose strains become drug-resistant during treatment.

Our own experience is not readily compared with that abroad, owing to differences in the technique of sensitivity-testing and in the criteria of drug resistance. A survey by Rist and Crofton [5] suggests that Britain, together with Belgium, Holland, and Germany, has a relatively favourable record. Moreover, we may reasonably expect a considerable decline in our prevalence of both primary and acquired drug resistance in the next few years as the result of improving standards of treatment.

1. Thomas, H. E. *Tubercle, Lond.* 1961, **42**, 1.
2. Fox, W., Wiener, A., Mitchison, D. A., Selkon, J. B., Sutherland, I. *ibid.* 1957, **38**, 71.
3. Public Health Laboratory Service Report. *ibid.* 1961, **42**, 308.
4. Crofton, J. *Brit. med. J.* 1960, ii, 679.
5. Rist, N., Crofton, J. *Bull. Un. int. Tuberc.* 1960, **30**, 2.

THE FATHER OF THE MAN

CONCENTRATING on present imperfections, we sometimes forget how much real progress has been made—even in the past hundred years. In the first of his five Heath Clark lectures, given last Monday at the London School of Hygiene and Tropical Medicine, Prof. A. V. Neale spoke on Child Health, Past and Present; and his photographs of ragged children, from the days before the first world war, gave visual support to his descriptions of a time so recent yet so distant.

Beginning with the story of education, he showed what immense prejudices—economic and social—the pioneers had to overcome before there was general assent to the idea of education as something to which every child has a right. (The late Alan Gregg, he recalled, pointed out that a major obstacle to new ideas is fear—and fear can disguise itself as " caution, or sanity, or reasoned scepticism, or on occasion even as courage ".) Just over a hundred years ago, in one area, of the 31,000 children between three and fifteen years of age and not at work, " 40% were kept from school on account of an alleged inability of the parents to pay the few pence per week towards the school ". Even in 1907, after the long battle for compulsory education had been won, council-school children in Liverpool differed from secondary-school children at the age of eleven, by 5·8 in. and 23 lb. Half the children in the poorest school were medically unfit to receive education.

According to William Farr's report in 1876, the proportion of children dying under the age of five was about 75% in 1730–49, and 32% in 1811–29. Even in 1915–24, the figure was 13·8% in England and Wales: that is to say, of 927,000 children born, some 129,000 died before they were five. In the earlier years, this wastage of child life seemed inevitable because epidemic infection seemed inevitable—not to mention malnutrition. But a time came when people at least no longer assumed that illness and disease afflicted the poor because they were " intrinsically inferior ". If afflicted them, usually, because they were poor.

Today, in this country, though conditions for children are in many ways unsatisfactory, their mortality and infections have been reduced phenomenally. But, as Professor Neale said, we in these islands should not mistake our own rarefied atmosphere for that of the rest of the world. In some tropical countries common diseases such as measles and pneumonia have fatality-rates like those in our crowded cities forty years ago, and in many parts of the world protein deficiency is widespread. Yet the calculated surplus of wheat in exporting countries last year reached 60 million tons. The proteins of whole wheat and milk are a perfect physiological combination; and the fitness of such people as the Hunzas, on the borders of Afghanistan, shows what good could come of full distribution of the world's granary and of the world's milk. Medical education, Professor Neale believes, " must contain increasing emphasis on social, economic, cultural, and non-bacterial causes of illness ", and he put in a cogent plea for pædiatrics on the ground that health in infancy and childhood not only maintains ability to profit from education but also has effects continuing throughout life. The lower the standard of education and cultural background, the earlier the general decline of mental processes. So " preparation for ageing really begins in childhood ".

From Words to Wards

4. THE IMPORTANCE OF THE ARCHITECT'S BRIEF

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HOSPITAL authorities are looking forward to an acceleration in their capital building programmes, and many clinicians are being brought into planning discussions. Neither the architect nor the medical staff may have had any previous experience in designing new hospitals, but a successful scheme can be achieved with a good architect and a first-class briefing, based on sound ideas and clear instructions.

The architect who hopes to design a successful building regards his brief as of fundamental importance in the same way as the clinician who hopes to reach a correct diagnosis regards the patient's history. The analogy can be taken further: the clinician wants the patient to give his history concisely and in his own words, without any attempt at an interpretation. Similarly, the architect prefers his client to describe his needs by explaining in simple terms his work and the use to be made of the new building. The architect does not expect the brief to be given in the form of the client's own sketch plan, because it is his own task, for which he has been trained, to interpret the information he is given and thereby to put forward his architectural scheme.

The brief given by medical men, like the history given by patients, can vary in quality. Just as the patient may have to provide the clinician with information of which he does not appreciate the significance, so the clinician must be prepared to answer the apparently irrelevant questions of the architect. He must supply precise details of the work of his department and give his reasons for any demands he makes. Unfortunately, the existing design and facilities of many hospital departments are entirely unsatisfactory for the function which they at present fulfil, although hospital staffs have shown themselves to be remarkably adaptable to unsuitable conditions. The staff may therefore come to accept these conditions and be so accustomed to their existing environment that they cannot visualise working in any other way. Before briefing the architect the clinician must try to dissociate his method of work from his existing department and make a critical, objective analysis of his essential activities.

The diagnosis and treatment of individual patients is the first concern of the clinician, but, with the ever-increasing complexity of medical techniques and the many administrative problems associated with the admission and treatment of each patient, no member of the medical staff can work in isolation. Each member of the medical staff should, therefore, look afresh at his work against the background of the total hospital environment in order to give a satisfactory brief to the architect.

The contribution which each clinician makes to the successful planning of a new hospital or department depends to a certain extent on the way in which he is used by the planners. He cannot be expected to give a complete and satisfactory brief formulated on a single occasion during the planning of a scheme. His information will contribute to the completion of each stage in the planning process, and he can expect that the architect will consult him on different aspects of his work at different times. At each of the various planning stages the individual members of the medical staff must be given certain essential information on the general scope and content of the project to enable them in return to give an intelligent brief concerning their own needs.

Preliminary Planning Leading to Preparation of Case of Need and Block Plan

In the preliminary stages the clinician must have a clear idea of the essential relation of his department both to other clinical areas and to the non-clinical or service departments. Factual and statistical information about his work will be helpful to the planning team in assessing the approximate size of the department and in comparing the claims of the different departments to be allotted the more central and convenient areas. The information required will include the demands to be made on the diagnostic services (such as the departments of radiology, pathology, and electrocardiography), the use which will be made of treatment areas (such as the operating-theatres and department of physical medicine), and the quantity of supplies from such service or processing departments as central sterile supply, central stores, central linen, pharmacy, and kitchen.

The architect will want to know the load of work to be undertaken in the new department, and this information must be given in units or measurements which can be readily understood. For example, the brief for a new outpatient clinic must state the number of patients to be dealt with in a session, the average time spent on each patient, daily or seasonal fluctuations, peak and minimum loads, and the maximum number of patients and relatives who may be waiting at any one time. In all cases future trends should, if possible, be forecast. Details should include the number and category of staff who will be working in the department at various times. The main circulation routes of staff, patients, and visitors should be described. Statistical information is an essential part of a good brief.

During the preliminary planning the medical staff, even as a group, cannot regard themselves as the sole clients. Large sections of a hospital are outside the clinical areas and are concerned with administration, staffing, welfare, maintenance, supply, storage, processing, and catering, &c. The architects must give equal attention to the needs of these areas, and their essential demands must be reconciled with the demands of the clinical areas. The medical staff has a part to play in providing the architect with some of the information he needs about these supporting services. The pathologist, for example, will be an essential member of the team which will instruct the architect on the requirements of the central sterile supply department, and the general physician will be concerned with the adequate provision of a diet kitchen.

It will help the client to clear his own mind and to rationalise his demands by setting out his brief in writing. A satisfactory appreciation of his needs will be obtained only by discussion between him and the architect. Mutual confidence and a satisfactory personal relationship between architect and client is essential for a sympathetic interpretation of the brief.

Intermediate Planning Leading to Completion of Schedule of Accommodation

The architect can produce at this stage a block plan showing the relation of the departments one to another. When it comes to the more detailed planning of individual departments the architect must be given a schedule of accommodation. This consists of a list of rooms with their approximate floor areas and brief notes of their function and the essential relationship of the rooms within the department. The series of *Building Notes* now being published by the Ministry of Health will be helpful in preparing this schedule. These *Building Notes* show for each department a list of rooms making up the " basic accommodation " which are regarded as essential for that department in all normal circumstances. This list is supplemented by a schedule of rooms providing " additional accommodation ", the need for which varies according to the particular circumstances, and for which a case will have to be made if its inclusion is to be agreed. It will be found that the accommodation suggested in the *Building Notes* is adequate for most departments; but the suggestions are not intended to be accepted as rigid standards to be applied in all cases. The majority of hospital staff is now working in out-of-date departments with facilities unsuitable for modern standards of treatment, and the first demand of most clinicians will be for more space. The initial cost of capital building and the subsequent running expenses of a modern hospital make it essential that each department should be economically designed. When the Ministry's standards are compared with the scale of provision of some of the lavish hospitals that can be seen abroad it may be thought that the limitations which are imposed in this country are too restrictive. There is, however, sufficient flexibility in the standards of accommodation which the Ministry now approve to provide for all reasonable demands. To make the best use of the accommodation which can be made available it is vital that the hospital should be planned as a coordinated unit in which services and certain areas are shared between different departments.

The scheme must be critically examined at all stages in planning to ensure that it provides for the changes in medical practice which will inevitably occur. Insistence upon self-contained departments, designed for the particular needs of individual clinicians, will prejudice the essential flexibility of a modern hospital. A plan must be judged not only on the convenience of the building for immediate use but also on its adaptability to meet changing needs over the next ten to fifty years. It is here that the vision as well as the tolerance of the clinical staff and other heads of departments can make a valuable contribution to ensure that the best use is made of the capital building allocations.

Final Planning Leading to Completion of Sketch Plans and Start of Working Drawings

To complete this stage of planning the architect will need to know the final details of all the items to be included in the building contract. The clinician, although head of his department, must appreciate his position as a member of a team and at all stages of planning give other members of his staff an opportunity to state their requirements. In the majority of clinical areas the medical staff attend only periodically, whereas for many members of the staff the department is the permanent working environment. Apart from the technical advice and practical points which they may have to offer, the staff should have the satisfaction of knowing that they have contributed to the planning of the building in which they are going to work. At this stage in briefing the architect, it is particularly important that the nursing, technical, and other professional staff should be brought into the discussions and given the opportunity of offering the useful information which they possess. An intelligent brief requires that those who are being consulted are first given information on the decisions which have been taken in previous stages of planning and the limitations within which their needs must be specified.

The position of the department within the total scheme will by now have been decided; the schedule of accommodation will have been fixed; lines of communication and circulation routes of personnel and supplies will have been determined: the information which is now required will concern the services and fixed equipment to be provided in each room. The departmental planning team must have worked out their main requirements under a number of headings, taking into account general considerations such as prevention of noise and measures to combat cross-infection:

Central Services

These must, wherever possible, conform with the general requirements of the whole hospital or block within which the department will be situated. The items for consideration under this heading include the following:

(1) *Heating.*—Are there any specific requirements for the department—e.g., locally controlled heating to be available when the general space heating of the whole hospital is not available? This will usually be required in areas where patients have to undress or where their treatment calls for extensive esposure of the body surface. Supplementary heating may be needed on cold mornings in early summer, &c.

(2) *Lighting.*—If ' Tungsten ' or fluorescent lighting is being provided as the basic form of illumination, are there any clinical reasons why this is unacceptable in a particular area? Where will additional lighting-points be needed? Which rooms will need blackout facilities? Is emergency or standby lighting essential?

(3) *Ventilation.*—Which areas or rooms within the department will require a system of artificial ventilation? How many air changes an hour will be needed?

(4) *Windows.*—Are there any particular requirements regarding the design of windows? Are any rooms to be " protected "? Is direct sunlight undesirable?

(5) *Mechanical and electrical services.*—In which rooms and at which points will the various services (electric socket outlets, piped suction, oxygen and nitrous oxide, water, town's gas, steam) be needed?

(6) *Communications.*—Which rooms will need internal and external telephone services? What use will be made of the general staff location system? Where will connection with a pneumatic-tube delivery system be needed?

Surface Finishes

What are the important criteria for the surface finishes in the department and in which room? Will the floor surface need to be anti-static or washable? Are there any special requirements in the wall finishes? In which rooms will acoustic tiling be necessary? Are there any special needs regarding colour?

Fixed Equipment

At this stage the architects will want preliminary information on all items of fixed equipment. This will

include items connected to any of the central services and those fixed to the floor, walls, or ceiling. The clinician may justifiably wish to postpone his final selection of the type and manufacture of some items of fixed equipment until later, but he should be able to specify the approximate size of the items, their position, and the services which will be needed to operate them. It will be necessary to specify the position which all these items will occupy in each room. If this information is given in relation to a floor plan for each room it is important to visualise the room in three dimensions and to state the correct height for wall fixtures.

Unfixed Equipment

The schedule of unfixed equipment will not be called for at this stage of planning; nevertheless, the client must have a clear idea of the main items of moveable equipment which will be needed for each area, since their size and position may affect the decisions on such items as the position of lighting points and switches.

Importance of the Doctor in Hospital Planning

This description will have given some indication of the complexity of hospital planning. The doctor as a client should not be disheartened if he is unable to provide all the details which are needed. For a busy clinician the opportunity of being associated with the planning of a new hospital may come but once in a lifetime, whereas the preparation of a comprehensive technical brief requires considerable experience. Regional hospital boards now have officers who, by doing the job several times, are accumulating an expertise in briefing architects. It is their function to coordinate the planning and to assist the medical staff in putting forward sound ideas. The individual clinician, however, is the only person who can describe his own work and the probable future developments of his specialty. Only with this information can the architect obtain his inspiration to draft a scheme which will produce a truly efficient and human institution.

Conferences

NEUROLOGICAL SURGERY

FROM A CORRESPONDENT

THE second International Congress of Neurological Surgery was held in Washington D.C. on Oct. 14–20, under the presidency of Dr. PAUL C. BUCY. Some 1200 neurosurgeons attended from over 45 countries.

Radioactivity

Dr. C. A. TOBIAS (Berkeley, California) gave a general review of the various " rays " investigated for the purpose of producing tissue damage of selected and limited size applicable to tumour destruction, and to neural damage for relieving tremor, &c. Some of these techniques enable a lesion to be made at a calculated depth in the brain (under intact coverings) which is so limited and cleanly demarcated as to resemble a knife-cut. The effect of this " Bragg peak " of the alpha-particle radiation can be to cause neurones to disappear completely from the irradiated zone—without later gliosis. This may provide a unique therapeutic tool, and already it offers a wide scope in experimental neurophysiology. Dr. WEBB HAYMAKER (California) discussed the relation of dosage to tissue damage as revealed in histological studies by modern techniques. Species and cell-type variation in sensitivity was emphasised by others. Prof. LARS LEKSELL (Stockholm) has been pursuing similar work with the proton beam to produce deep lesions for the relief of mental disorder and parkinsonism. He presented a patient in whom tremor had been so treated a year previously with obvious benefit. The accuracy of the technique is such that the lesions are made through portals only 7 mm. in diameter; improvement started about 13 days after treatment.

Destruction of tissue by radiation is not the only use, for it was reported that appropriate beams of radiation will stimulate nerve-cells. Further development is likely to provide a method whereby chosen groups of cells, superficial or deep, can be stimulated without the introduction of any electrodes—surely an excellent technique for experimental physiology, and one which will make present-day methods of direct focal electrical stimulation appear clumsy.

Diagnosis by radiation methods, which depends on scanning the head after injection of radioactive substances that have a predilection for pathological areas, has been studied since the end of the war. Various substances have been tried, and ^{32}P, ^{131}I, and ^{206}Bi, are among those at present favoured. Dr. THÉRÈSE PLANIOL (Paris) presented the results obtained in 1800 patients examined in the past 6 years. Intracranial expanding lesions were correctly detected in 83%. Where the tumour was either a meningioma, glioblastoma, or metastasis, the scan was positive in over 90% of cases. The method is perhaps most useful in the diagnosis of small hemisphere tumours which may not be revealed by other techniques, though whether a positive scan would then lead to earlier operation and better results depends upon clinical judgment—another matter.

Finally, reports were made on the use of radioactive isotopes by direct introduction—to produce localised brain damage for treating, say, involuntary movements, or into tumours and the hypophysis for their destruction. Dr. JEAN TALAIRACH (Paris) and Mr. JOHN HANKINSON (Newcastle) described their experiences with ^{198}Au and ^{90}Y. There was general agreement that tumours over 4 cm. in diameter were better treated by external radiation. Some good results were reported in the treatment of third-ventricle tumours, though this method was of doubtful value in Rathke-pouch tumours. Whether direct radiation by the introduction of radioactive isotopes will prove preferable to conventional radio-therapy has yet to be proven.

Intracranial Tumours

Half the symposium on this subject was allotted to parasitic and granulomatous lesions. These lesions are rare in Great Britain; but with the increasing speed and frequency of intercontinental communication they are likely to be encountered sporadically anywhere, and it behoves us to make sure we can recognise the unusual in order to adopt the best treatment: this is particularly necessary with cerebral hydatid cyst.

Tuberculoma is still common in undernourished populations, and in India accounts for 20% of all proven intracranial masses. Dr. B. RAMAMURTHI (Madras) has found angiography of great value in diagnosis. Calcification is encountered in only 6% of cases. Treatment with streptomycin and isoniazid may relieve raised intracranial pressure in a few days, presumably by diminishing brain œdema. Surgical measures include ventricular drainage for posterior-fossa masses, and excision of hemisphere masses if papillœdema threatens eyesight; but resection should be avoided if possible whenever there is severe neurological deficit since this is likely to persist. Postoperative treatment is continued for a year, and intrathecal instillation of streptomycin is not necessary. Dr. FERNANDO CABIESES (Lima) also reported upon a large series, but with the curious difference that in some regions of Peru and elsewhere tuberculoma was frequently found in patients with no other active tuberculous lesions. He also emphasised the importance of thorough antibiotic treatment coupled with administration of corticoids, and the need if possible to avoid excision.

Valuable reviews on hydatid disease and cysticercosis were made by Dr. ROMÁN ARANA-IÑIGUEZ (Montevideo), Dr. SIXTO

OBRADOR (Madrid), Dr. F. S. HADDAD (Beirut), Dr. LUCJAN STEPIÉN (Warsaw), and Dr. BASIL GRIPONISSIOTIS (Athens). There was general agreement that eosinophilia and Cassoni's reaction were quite unreliable guides. Various manœuvres can be adopted to eradicate a hydatid cyst in the brain if it is intact, but hydatid disease of the spine is a much more difficult problem. Cysticercosis remains a very serious disease (with epilepsy as perhaps its least objectional sequel); only about a third of the patients have long-lasting benefit from treatment. The biochemists have an immense research field here, for successful chemotherapy would bring relief to innumerable patients in many parts of the world.

Pain

This symposium was opened by Dr. G. H. BISHOP (St. Louis), who was followed by Dr. W. NOORDENBOS (Amsterdam) in a review of current views on the anatomy and physiology of central afferent pathways. The common failure to achieve permanent relief of severe pain by section of afferent pathways is probably related partly to the variety and complexity of pathways mediating pain, their widespread connections—particularly through the reticular formation—and their varying conduction-rates. In this mechanism, which normally is highly intricate, the interference pattern must become even more complex when disturbed by the surgeon. Various standardised operations were reviewed with a healthy critical appraisal of long-term results, which are not so satisfactory as many of us had imagined. With the introduction of stereotaxic surgery, hopes were high that lesions in the appropriate parts of the thalamus might solve this problem, but both Prof. T. RIECHERT (Freiburg) and Dr. H. T. WYCIS (Philadelphia) confirmed that, though lesions here were immediately successful in over three-quarters of the patients, pain recurred in about half. Most pain-relieving operations are successful for a short period, and assessment must be based on at least a five-year follow-up. What is satisfactory for a patient with pain from cancer will not necessarily prove so for a patient with a non-lethal painful condition. A new approach is that of coagulating the white matter between thalamus and parietal lobe, but long-term results are still awaited. Dr. J. C. WHITE (Boston) and Dr. R. G. SPURLING (Louisville) gave their experiences of modified leucotomy as a means of helping patients with intractable pain, and particularly those with malignant disease. In these, if selection is careful much can be achieved; with modern selective techniques impairment of personality is rare and slight.

Cerebrospinal Fluid

Observations by Dr. B. M. BLOOR (Morgantown, U.S.A.) suggest that the oxygen tension in cerebrospinal fluid (C.S.F.) closely follows that in the cerebral arteries. In studies on the effect of total circulatory arrest the rate of fall of C.S.F. oxygen tension was found to be directly related to the degree of hypothermia; the time of onset of pupillary dilatation was correspondingly delayed.

Hydrocephalus

Mr. R. T. JOHNSON (Manchester) gave a masterly review of the morbid anatomy of hydrocephalus; and Dr. D. D. MATSON (Boston) and Dr. F. E. NULSEN (Cleveland) assessed methods of treatment. Torkildsen's ventriculo-cisternostomy remains a valuable operation in non-communicating forms, but a modification is recommended in some cases (e.g., in the first year of life); the distal end of the tube is placed in the upper cervical subarachnoid space instead of in the cisterna magna. Subarachnoid-ureteral shunts work well, but have obvious disadvantages (risks of infection and of electrolyte disturbance). Subarachnoid peritoneal drainage is still on trial; the formation of a "petticoat" of plastic film around the lower end of the tube, described by Dr. LUYENDIJK and Dr. NOORDIJK (Leyden), appears to lessen the frequency of omental adhesions. The value of a mechanical device (valve) interposed in a catheter connecting lateral ventricle and superior vena cava, thus shunting excess C.S.F. into the venous return, is now assured. When this works well the results are excellent, but it has disadvantages. If the lower end of the tube is too high (i.e., within the internal jugular vein) thrombosis is likely to close it; if it is too low (within the atrium) bacteræmia may develop. As Dr. ROBERT PUDENZ (Pasadena) stated in his review, the "ideal" surgical technique has not been forthcoming.

* * *

It is healthy for us to consider where British neurosurgery stands in the world forum provided by this congress. In applied (clinical) neurology and in accepted surgical techniques it equals the best found anywhere, and this high standard is a matter of justifiable pride. In the newer techniques of radio-isotope application and stereotaxic surgery, exigencies of staffing, space, and finance have restricted their evolution to a relatively few centres. But where we fall behind is in the areas of basic research. Many more links have yet to be forged between our neurosurgical teams and university departments of anatomy, physiology, pathology, and biochemistry. Moreover the possible applications of nuclear physics to research and therapeutics could well be examined. Research in our neurosurgical centres—except along clinical and paraclinical paths—is limited. As in other branches of medicine the causes of this are not obscure; they are plainly evident. There is need for a more liberal establishment of consultants and of those in serious training, thus allowing both grades to spend part of their time—if they truly desire—in pursuing long-term problems of research, freed during that time from the urgent calls of routine neurosurgery. There is need also for much more laboratory space. The imagination of our neurosurgeons will readily provide the ideas, but the imagination of the hospital and Ministry administrators must be fired so that they see the need and provide the means.

Special Articles

CARDIOLOGY WITHOUT TEARS

GEOFFREY BOURNE
M.D. Lond., F.R.C.P.
CONSULTING PHYSICIAN AND CARDIOLOGIST
TO ST. BARTHOLOMEW'S HOSPITAL, LONDON, E.C.2

OVER the years, human beings collect fads, fancies, and personal characteristics. This paper is written to record such professional acquisitions of my own as may be of benefit to other cardiologists. They are mostly minutiæ of technique; but in the daily routine they have contributed to the efficiency and, I like to think, the accuracy of my clinical work.

THE CONSULTING-ROOM

I shall only refer in passing to such obvious qualities as absence of outside noise and presence of a good light. The light should be as oblique as possible so that, by positioning the patient, lateral illumination may cause to stand out from the shadow edge on the skin, like the mountains of the moon, such slight prominences as aneurysmal pulsation, systolic recession, and the collateral arteries of coarctation of the aorta.

The consulting-room should be easily shaded to help the visual accommodation necessary in X-ray screening, and also easily blacked out. In my opinion its furnishing

and layout should combine comfort with efficiency. The stark functional entourage characteristic of the operating-theatre and the outpatient casualty room should be avoided, for they will only raise unnecessary apprehension in a nervous patient. The decoration should be to the physician's own taste, and thus a visible part of his personality.

The examination couch is the most important piece of furniture. Many of those supplied by manufacturers, and used stubbornly by physicians for years on end, are too low and too narrow. The results are backache for the doctor and non-relaxation in the patient, which affects both the ease of abdominal examination and the clarity of the electrocardiogram. My couch was made to order. Its height is 32 inches, its length is 6 feet 3 inches, and—a most important point—its breadth is 30 inches so that a large fat man can lie on it with his arms properly supported and relaxed. The head end is hinged, and, with the help of pillows, adjustable to maximum comfort.

Winter and cold weather can introduce a discomfort not always noticed by the warmly clad physician—a discomfort which, as well as affecting good doctor-patient relations, predisposes to muscular resistance to palpation and to tremor in the electrocardiogram. The easy answer to this is to cover the couch for some time previously with a long electric blanket which can easily be switched off and removed just before the examination.

THE CONSULTATION

I divide the consultation into history-taking, physical examination, electrocardiography, X-ray screening, and lesser techniques such as examination of the urine for albumin and sugar, and estimation of the hæmoglobin.

History

I have always done without the assistance of a nurse, and set aside an hour for each case. In this way the history can be taken both unhurriedly and privately, one can be meticulously thorough as to the time of origin and exact character of every successive symptom, and full rapport can be set up between a nervous patient and oneself. Not infrequently, half an hour later, during the mechanical routine of taking the electrocardiogram, the patient has plucked up courage to volunteer a piece of information, pathological or personal, which shyness had previously inhibited.

Records

It is helpful to use a printed note-sheet, with sections for past history, family history, and history of the present condition. Each section contains the relevant inscribed headings—for instance, rheumatic fever under past history, and dyspnœa, palpitation, pain, and other common cardiovascular symptoms under the present condition. Each physician should map out his own case-sheets, and they should be comprehensive so that mistakes of accidental omission due to fatigue or laziness are prevented. I use a paper folder with the above sections outside. Inside and to the left is space for notes on the physical examination, and on the right, from the top downwards, are spaces for notes on the electrocardiogram, cardioscopy, and pathological investigations, and on the diagnosis, prognosis and suggested treatment. Within each folded sheet are kept doctors' letters, a copy of the electrocardiogram, and other relevant papers.

These notes are filed alphabetically, and at the end of the year they are stored in box files. Inside the cover of each box is pasted an alphabetical list of the patients whose notes lie within. If one of these is seen in a later year his name is scored through, and beside it is written the year to which his notes have been transferred.

Examination

The physical examination should, I think, be done with the patient first standing and then lying down. The lungs are best examined in the erect position, and the blood-pressure and certain cardiac signs vary with posture. Some aortic murmurs are most audible with the patient upright, when those of mitral stenosis may be inaudible—a point which suggests a slight lesion. Moreover if tachycardia is noticed which very soon subsides on lying down, light is thrown upon the degree of vasomotor control or instability.

Ascent to the couch for shorter people is by way of a symmetrical three-step 'Master' set, with two steps up on either side; each step is 9 inches high and 30 inches broad, and the treads are 9 inches wide. These steps also serve for the exercise test in suspected coronary-artery disease.

The stethoscope should be of the dual-purpose variety, with a diaphragm for sounds of high frequency, and a bell for those of a lower pitch.

The sphygmomanometer that I like best is made by the W. A. Baum Co. Inc., New York. I apply the inflatable cuff in the opposite direction to the usual one so that the tubes lead directly up to the machine, which is balanced on the pillow or near it. The antecubital fossa is thus left entirely clear for finger and stethoscope; moreover, the figures beside the mercury column are not visible to the patient. The blood-pressure should always be first estimated by palpation.

Direct ophthalmoscopy of the undilated pupil is often difficult even in a well-darkened room. Better than the routine battery ophthalmoscope is the modern instrument with a large bulb, fed from the mains supply through a transformer. I have found that the 'Pantoscope', made by Keeler, enables one to see most retinæ very easily, and is well worth the cost.

Special Techniques

Electrocardiography can be deprived of some of its worries by choosing a machine whose chief qualities are accuracy, sturdiness, and immunity from electrical interference. My own is made by the Sanborn Co., Massachusetts. To my mind the extra cost of purchasing the best machine available is recouped in the saving of time and absence of frustration. The use of suction in placing the chest electrodes is universally known, but fewer people are aware that suction electrodes can also be used on the arms and legs. They are more convenient and quicker to apply than the usual band-and-plate type. Suction limb electrodes are larger than the chest variety. The kind I use are made by the Welsh Corporation of the United States.

The type of X-ray apparatus which I have found most useful has a large fixed screen and a tube (movable both horizontally and vertically) fitted with diaphragms which can be used in both directions to reduce the visual field to a slit. With the aid of a glass-writing pencil to mark the cardiac borders, it is easy to measure the size of the heart

accurately and quickly. Such measurements repeated in the same case over the years have given very valuable information in prognosis. The pencil can be suspended from one side of the screen, and a piece of wash-leather, to erase the marks, from the other. The technique and reliability of the method have already been described.[1]

A further point in cardioscopy is that a thin woollen shawl, hung from two small laundry pegs, and suspended over the inner side of the X-ray screen, will save the patient from contact with the chilly and clammy surface of the glass.

* * *

The details described above may seem irrelevant to the main purpose of the examination. But they have all in turn been carefully evolved, tested, and retained because they increase clinical efficiency and help to diminish that sense of muddling through and making do which is not altogether alien to our national character.

FERTILITY AND HEALTH IN INDIA

MAUNG SEIN
M.D. New York State, M.B. Lucknow

A SOUND health programme requires reduction of birth-rates as well as reduction of death-rates, and in 1952 the Indian Government wisely and courageously decided to include " designed fertility " as an essential part of its health and five-year plans. Starting from nothing in 1952, there are now more than 110 rural and 700 urban contraceptive clinics; and in the Third Five-year Plan 500 million rupees (about £28 million) or 7% of the total health budget, is to be used for family planning. A director of family planning (within the Ministry of Health), helped by various technical and lay committees, coordinates the research and programmes of each State.

But, looked at objectively, the task of improving family health has hardly yet been touched. The rate of population growth has not even been slowed down: in the ten years 1950-60 the population increased by 38 million compared to 30 million in the previous ten years when no programmes were in existence. Of the 220 million in India who are in the reproductive phase of their lives (15–45), the present education programmes have hardly reached 5 million. By 1966, under the five-year plan, the number of contraceptive clinics should be 8200, or one for every 27,000 users (compared with one per 110,000 today): but, even so, the bare requirements of a simple educational programme will scarcely be met. Expenditure will be a little more than half a rupee per couple per year for all their requirements.

At present the manufacturers of contraceptives in India produce less than an eighth of what would be needed if contraceptives were used by everyone for family planning. Vaginal creams and jellies are not manufactured to any sizeable extent in the country. Good modern obstetrical care is unobtainable by the villager, living in poverty on an inadequate diet. The picture is depressing, and it can be changed only by newer approaches and almost fanatical dedication.

ALTERNATIVE MEANS OF CONTRACEPTION

The number of children that a fertile couple have depends (*a*) on how far they are determined to keep down the size of their family and (*b*) on the efficiency of the contraceptive methods they use. When motivation is strong, even simple methods such as coitus interruptus will result in smaller families.

For the average Indian villager—and two-thirds of the population live in villages—all the existing contraceptive methods are unsuitable. Though some 150,000 males have been sterilised by surgical teams, there cannot be enough teams to make this a practical solution. Lack of laboratory facilities for sperm-counts rules out temporary sterilisation of the male by oral drugs. Only contraceptives taken by mouth by the woman have any real hope of acceptance.

To the general use of progestin compounds which inhibit ovulation there are various objections. Side-effects (especially changes in the menstrual cycle) are uncomfortably frequent: the high level of gonadotrophins needed to inhibit ovulation may disturb endocrine balance and cause stromal proliferation of the endometrium. The compounds can be ineffective in those women in whom coitus " triggers " ovulation, or in whom ovulation occurs more than once in the cycle. And a cost at present in the region of £3 a month is for the vast majority of India's women utterly prohibitive.

My own belief is that far more is to be hoped for from quite a different approach:

> The fact that the cervical mucus undergoes cyclic changes in its viscosity and electrolyte content was first observed well over a hundred years ago by Marion Sims in New York and by Tyler Smith in England. During the first ten days of the cycle and during pregnancy the cervical mucus is solid and it acts as a plug impervious to bacteria and spermatozoa. Moreover, sperms survive only in alkaline cervical mucus containing fructose: in the normally acid vagina they are immobilised and killed within minutes. The " cervical factor " is in fact the most decisive single factor determining a woman's fertility, and the reason why vaginal creams and jellies prevent conception is usually that they coagulate the mucoproteins of the cervical mucus.
>
> What we need, therefore, is a compound which, when taken by mouth will thicken cervical mucus without inhibiting ovulation; and the action of some of the newer progestin compounds holds out some hope that this may be feasible.

PERSUASION

In India, vast numbers of people have to be convinced of the necessity of limiting families in order to improve their health. To get this idea of fertility design accepted and adopted as part of the private lives of 220 million reproducing people is a gigantic task as yet hardly touched. Gigantic yet delicate; for the problems are intimate and to be useful, any approach to them demands tact, sensitivity, ingenuity, and imagination. The best hope lies in a health approach of which fertility design is a part. Only when the villager's confidence has been won will he act on our advice; and his confidence will not be won unless we convince him that we are primarily concerned with his well being—that we are not just following the latest political craze.

Designed fertility, adequate nutrition, and good medical facilities are three things absolutely necessary if the Indian villager is to exchange his sickly, painful, despairing subhuman existence for a healthy, happy, energetic one.

1. Bourne, G., Wells, B. G. *Lancet*, 1951, i, 17.

CONSULTANTS AND SENIOR REGISTRARS

THE Ministry of Health and the Department of Health for Scotland have issued data on the numbers of consultants, by year of birth, in each specialty and the number of notional half-days for which each group is employed, and similar data on senior hospital medical officers. The figures for numbers of consultants are shown in table I.

The Health Departments have also issued figures for numbers of consultants in each specialty by years since 1949 (table II) and numbers of senior registrars by specialty and training position (table III, overleaf).

All the figures relate to England, Wales, and Scotland.

Similar, but rather less comprehensive, figures were issued in 1958.[1]

1. See *Lancet*, 1958, ii, 572.

TABLE I—NUMBERS OF CONSULTANTS IN GREAT BRITAIN AT JULY 1, 1960*: ANALYSIS BY YEAR OF BIRTH AND MAJOR SPECIALTY†

Year of birth	All specialties	General medicine	Diseases of the chest	Mental health	Neurology	Pædiatrics	Radiology	Radiotherapy	Physical medicine	Pathology	Infectious diseases	Dermatology	Venereal disease	Ophthalmology	General surgery	Anæsthetics	Neurosurgery	Plastic surgery	Thoracic surgery	Trau. & ortho. surgery	E.N.T.	Gynæcology & obstetrics
All years	7867	992	316	742	92	236	525	147	89	744	45	56	71	349	1005	883	66	58	100	384	352	515
1889‡	7	..	..	..	..	..	1	..	..	3	..	..	..	..	1	..	..	..	1	..	..	1
1890	3	1	..	..	..	..	1	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..
91	5	1	..	..	..	..	..	..	..	..	..	1	..	1	1	..	..	..	..	..	..	1
92	6	1	1	..	..	1	..	..	..	..	..	1	..	..	1	..	..	..	..	..	..	1
93	11	1	..	..	..	1	2	..	..	..	..	1	..	4	1	..	..	..	..	..	..	1
94	15	2	1	2	..	..	..	1	..	2	..	1	..	3	..	2	..	..	..	..	1	..
1895	70	10	4	4	1	3	6	..	1	8	..	1	1	5	11	6	..	..	..	1	4	4
96	108	14	3	4	1	2	8	..	1	8	3	4	3	10	20	8	..	..	1	3	8	7
97	131	14	4	16	..	2	10	3	..	10	1	5	..	6	23	16	1	..	1	4	9	6
98	153	21	4	15	..	5	10	3	1	8	3	4	3	13	20	17	..	..	..	3	9	14
99	195	19	7	17	3	3	13	5	7	19	3	4	2	17	35	14	1	..	..	4	11	11
1900	232	34	12	19	1	7	12	4	1	13	3	7	3	15	34	24	3	1	1	9	15	14
01	224	24	6	18	..	4	18	4	2	12	6	6	3	16	27	23	..	2	1	10	26	16
02	233	20	19	21	3	8	12	3	3	12	..	..	7	17	36	18	2	2	4	13	17	16
03	219	27	13	17	4	3	11	3	2	15	..	5	1	13	39	26	..	2	3	9	8	18
04	220	29	12	19	3	5	10	4	1	14	3	5	1	8	46	24	1	1	..	7	13	14
1905	202	32	9	28	2	4	10	3	..	19	1	1	5	14	26	16	1	1	3	7	8	12
06	246	29	13	30	1	5	11	3	4	18	3	4	1	10	38	29	3	1	2	11	13	17
07	271	50	17	29	4	8	11	2	3	26	1	2	4	11	30	16	1	2	4	22	9	19
08	246	33	5	30	5	12	7	6	3	20	2	6	..	13	37	21	1	3	2	16	12	12
09	277	41	11	21	7	8	11	4	3	23	3	3	1	13	32	25	4	2	2	18	15	30
1910	325	44	9	32	2	15	20	4	2	28	1	9	5	14	60	24	3	..	4	18	11	20
11	314	44	18	24	3	7	13	9	3	26	..	7	4	11	46	24	2	4	5	21	12	31
12	324	37	12	32	1	10	27	5	1	32	4	8	2	10	47	30	2	2	6	19	10	27
13	372	43	19	30	6	8	24	8	4	38	..	5	4	10	51	39	6	3	3	26	15	30
14	386	52	22	31	3	10	31	10	5	41	2	9	4	12	44	37	3	3	6	21	11	29
1915	425	63	15	38	6	15	26	2	6	42	..	7	4	14	41	55	4	7	6	29	14	31
16	398	51	13	33	4	15	34	5	3	40	..	6	3	13	53	49	4	5	7	21	15	24
17	361	40	15	33	7	15	23	9	3	37	..	7	2	14	40	46	6	4	10	20	13	17
18	300	30	16	30	1	17	19	9	6	33	1	10	2	9	30	34	2	2	8	14	10	17
19	290	38	12	24	4	9	23	6	6	30	1	7	1	11	37	22	4	3	3	15	12	22
1920	295	49	10	24	4	12	18	8	4	34	1	7	1	4	27	41	3	1	5	16	4	22
21	267	38	6	16	4	8	27	8	2	38	..	8	1	10	22	31	2	4	6	11	15	10
22	249	26	3	29	7	3	28	9	4	30	2	2	2	9	25	37	5	1	5	9	8	5
23	156	13	2	25	1	3	16	4	2	23	..	2	1	8	12	25	..	1	1	5	9	3
24	127	11	1	11	2	6	14	1	2	21	..	..	..	7	4	34	..	..	..	..	6	7
1925	103	4	1	23	1	2	8	1	..	9	..	..	..	2	6	32	1	1	..	1	5	6
26	49	3	..	8	..	..	4	1	2	6	..	1	..	2	..	19	..	..	..	..	3	..
27	28	1	..	4	..	..	4	..	1	3	..	..	..	..	2	10	1	..	..	1	1	..
28	12	..	..	2	..	..	2	..	..	..	..	..	..	..	..	8	..	..	..	..	..	..
29	2	..	..	1	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..
1930§	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Not stated	10	2	1	2	1	..	..	..	..	3	1	..	..	..	..	..	..	..	..	..	..	..

The table includes 66 consultants who also hold appointments as S.H.M.O.s and 37 consultants who also hold appointments as senior registrars. Honorary staff are included in the table, but staff holding locum appointments only are not included. Staff who hold consultant appointments and are personally graded consultant are included; staff holding consultant appointments but personally graded S.H.M.O. are not included.

* The Scottish element in these figures relates to June 30, 1960.
† The specialty to which the consultant devotes the greater part of his time.
‡ Born 1889 or earlier.
§ Born 1930 or later.

TABLE II—NUMBER OF CONSULTANTS IN EACH SPECIALTY IN GREAT BRITAIN EACH YEAR (DEC. 31) FROM 1949 TO 1960

Year	General medicine	Diseases of the chest	Mental health	Neurology	Pædiatrics	Radiology	Radiotherapy	Physical medicine	Pathology	Infectious diseases	Dermatology	Venereology	Ophthalmology	General surgery	Anæsthetics	Neurosurgery	Plastic surgery	Thoracic surgery	Orthopædic surgery	E.N.T.	Obstetrics and gynæcology	Totals
1949	755	216	449	53	166	327	85	49	495	50	127	89	331	927	496	37	30	49	252	312	424	5719
1950	831	250	504	53	202	378	93	57	526	52	136	101	341	943	602	39	32	57	269	328	439	6233
1951	857	266	532	59	208	400	101	61	541	48	135	99	342	948	655	42	33	66	293	341	449	6476
1952	904	310	566	61	214	414	108	70	581	51	142	97	351	986	714	44	36	81	320	339	473	6862
1953	905	340	595	67	222	436	112	75	631	60	145	94	342	982	748	46	43	89	328	346	473	7079
1954	924	344	616	68	226	447	116	74	646	59	146	93	340	987	782	48	48	91	335	350	485	7225
1955	939	347	635	69	229	463	123	76	675	56	148	94	340	992	805	51	50	96	346	351	493	7378
1956	953	346	659	72	233	485	129	82	691	56	152	91	338	984	820	53	51	96	357	345	493	7486
1957	965	344	687	77	237	493	134	85	723	56	163	88	338	999	852	57	54	98	366	348	500	7664
1958	985	343	705	81	242	507	134	84	744	51	164	83	343	999	856	60	57	100	369	343	504	7754
1959	1015	330	722	86	243	520	136	88	780	49	160	82	341	1002	865	66	61	102	376	345	507	7876
1960	1041	334	758	91	249	536	143	90	812	48	163	80	341	1012	905	69	64	104	393	349	521	8103

Consultants practising in more than one specialty have been included under each. The table includes honorary consultants.

TABLE III.—NUMBERS OF SENIOR REGISTRARS IN GREAT BRITAIN AT JULY 1, 1960*: ANALYSIS BY SPECIALTY AND TRAINING POSITION

Specialty	All staff	Year in grade of staff in training†						Staff completed training		Other staff§
		All yr.	1st	2nd	3rd	4th	> 4	Training plan post	Transitional or designated post‡	
All specialties	1333	971	340	262	181	131	57	127	68	167
General medicine	191	117	34	31	17	18	17	28	20	26
Diseases of the chest	32	23	6	4	3	6	4	3	4	2
Mental health	171	142	63	39	26	12	2	3	1	25
Neurology	17	15	6	3	2	3	1	..	1	1
Pædiatrics	40	24	6	4	6	5	3	6	2	8
Radiology	75	74	31	24	16	1	2	1	..	..
Radiotherapy	20	16	7	5	2	1	1	..	2	2
Physical medicine	11	9	1	3	3	2	..	..	2	..
Pathology	117	61	15	16	19	9	2	6	..	50
Infectious diseases	5	2	..	..	2	..	..	2	..	1
Dermatology	25	18	6	5	2	5	..	3	1	3
Venereal diseases	3	3	2	..	..	..	1	..	..	..
Ophthalmology	72	56	24	16	11	1	4	10	4	2
General surgery	198	129	30	41	19	32	7	31	19	19
Anæsthetics	102	95	50	23	13	7	2	4	1	2
Neurosurgery	13	12	7	4	1	..	..	1	..	..
Plastic surgery	12	8	..	2	2	3	1	3	..	1
Thoracic surgery	23	14	5	3	1	3	2	4	1	4
Trau. & ortho. surgery	68	48	15	13	9	10	1	7	1	12
E.N.T.	47	42	15	11	7	7	2	2	1	2
Gynæ. and obstetrics	91	63	17	15	20	6	5	13	8	7

The table includes 37 senior registrars who also hold appointments as consultants and 11 senior registrars who also hold appointments as S.H.M.O.s. Honorary staff are included, but staff holding locum appointments only are not included.

* The Scottish element in the figures relates to June 30, 1960.

† Year in the grade is based on the date of first entry to the grade: no account is taken of possible breaks in service in the grade. Years in the grade do not, therefore, necessarily show the senior registrar's position in the training plan.

‡ Post without limit of tenure (Ministry circular HM[58]58 refers).

§ Including honorary staff with university, medical school, or Medical Research Council appointments.

AIRBORNE MEDICAL SERVICES

THE 16th Parachute Brigade Group is the only regular airborne formation in the British Army. Its medical services are provided by 23 Parachute Field Ambulance and regimental medical officers to the major units of the Brigade. The field ambulance consists of sections of medical orderlies under command of a medical officer, a dental team, and surgical teams composed of surgeon, anæsthetist, and operating-theatre technicians.

Formed in Palestine when the 6th Airborne Division was disbanded and the 16th Parachute Brigade formed, the field ambulance served in Germany before moving to the Canal Zone. It has also been in Cyprus, Jordan, and Kuwait. Medical personnel of the Brigade have in the past year trained for periods of one to four weeks in Germany, France, Singapore, Malta, Tripoli, Cyprus, and all over the United Kingdom. The field ambulance also trains teams in mountain rescue, casualty-dog handling, light rescue, free-fall parachuting, and underwater swimming.

The health of the Brigade is cared for in a combined medical centre, staffed by regimental medical officers and members of the field ambulance. Officers share duties by rotation in the orthopædic firm as house-officer, in the medical centre (including medical cover for parachuting), and in training their sections.

The airborne medical services have always been up to strength, and competition for places has been keen. The advertisement we publish this week is to replace two medical officers leaving the Army in March, 1962. All ranks have to pass the tough selection test, and about 50% of volunteers fail. Medical officers have a higher pass-rate than the average.

In England Now

A Running Commentary by Peripatetic Correspondents

WITH their great eyes a-dream and their red and coryzal hooters flattened against the windows of the Ministry of Ill-health, British never-had-it-so-gooders last night marvelled at the fabulous reception given for Mr. Egomaniac Lumbago (Balliol, London School of Economics, and the Moscow State Circus), first President of the Ague-ague Archipelago Confederation, who is here to make his mark on the reciprocal health service agreement between the two countries.

Possessing the world's largest mangrove-swamps, and an elevation of plus or minus three feet above sea-level, according to the state of the tide, the Ague-ague Archipelago is going literally flat-out to attract the British tourist. The sea-air, being practically at sea-level, is most nutritious, while diseases such as black-water, yaws, trypanosomiasis, and kala-azar are just not mentioned—a fact the late Minister of Health was slow to appreciate.

British tourists who needed medical care would get it free, except for the State tax on the black cockerel whose sacrifice is essential for a successful consultation. All medicaments used are 100% pure (Lumbago Pharmaceuticals Ltd.). The bats' guano and dried lizards are garnered at the most auspicious lunar phase, and the highest standards of hygiene are observed in heating the sand used in shrinking the heads.

A "must" for the tourist is the annual Ague-ague Harveian celebration. This day is given over to stately and picturesque ceremonial, when conch-blowing, drumming, and dancing, with choral effects by massed bands of sacrificial pigs, make Big Beat Nite at the Beaulieu jazz festival sound like the horns of Elfland faintly blowing.

The Ague-aguans will also benefit under the reciprocal agreement, and the Look-No-Funnel Line (Lumbago Navigation Ltd.) will, when the hole in the bows is mended, be shipping at satisfactory rates some 2500 warriors to U.K. for the (N.H.S.) ritual nose-piercing and cicatrisation which confers immunity against hostile weapons, plus a couple of extra twiddly bits against strontium-90.

* * *

We have a new X-ray machine, of comparatively new design, with a bunch of intricate electrical and electronic circuits, which has been giving a little trouble during the running-in period. Its behaviour was a little unorthodox at times, and it would not stop working when required. Like all intermittent faults, the cause was elusive. After three hours on a Saturday morning the engineer was feeling depressed, harassed, and perplexed. I walked into the room for a chat and to offer my sympathy, leaning nonchalantly on the end of the couch, and with the other hand prodding about among the insulated wires which were suspect at the end of the diagnostic trail. As I jumped two feet into the air away from the set, we all realised that I had found something. After a long search with a torch, and a repetition of the performance, this time by the engineer himself, the pinched insulation and bare wire were located, and the fault rectified in another ten minutes.

Now, if they are in any trouble when trying to find a fault they send for me to put my finger on it.

* * *

It is perhaps fortunate for the smooth running of the health service that religious passions are not so strong as they were in the Middle Ages. This was brought home to me by the reference of an applicant for a post who had previously been a house-physician in a hospital in the eastern counties. It ended, "He is a Mohammedan of course, but there was no trouble at all on this score with the rest of the house staff, who were predominantly Hindu."

* * *

SITUATIONS WANTED

Surgeon interested in urology seeks opening.—Box .....

Advertisement in B.M.J.

Letters to the Editor

RECONSTRUCTING THE N.H.S.?

SIR,—It is hard to discern a consistent pattern of behaviour on the part of Government committees and of Governments themselves in dealing with the problems of the National Health Service. In the main Governments have tended to accept those recommendations which would least affect the existing structure and to ignore those which would radically alter it. The latter have been conspicuously few. The terms of reference of the committees may have been partly to blame for the lack of fundamental approach but the main cause is surely to be found in the attitude of the medical profession which has erected a background of opinion conducive to criticism of detail but not to constructive new thinking on basic assumptions—such as the role of the general practitioner in the changing pattern of medicine today.

The Platt report (lately accepted in principle by the Government) dealt almost exclusively with hospital staffing (adhering to its terms of reference) but attempted to find a niche for the G.P. in the hierarchy, thus missing the wide question of the G.P. in the community medical services and how his efficient use could change the role of the hospitals.

Dr. Galloway's letter (Oct. 28) is important because it underlines:

(1) The negative thinking of the profession on medical problems that can be solved only by a medicosocial approach, as he has indicated.

(2) The cumbersome waste of the tripartite administration of the N.H.S. The maternity services are not the only casualty—there are also, for example, problems of the elderly, child-guidance services, and lack of facilities for general practitioners (X-ray, &c.).

(3) The fact that the hospital service lacks that which the local-authority service and the general practitioner can provide: (*a*) democratic control by people elected by and in daily contact with the "consumer"; (*b*) preventive approach; (*c*) continuing care and after care; (*d*) personal medical care with a personal knowledge of the patient's family and background.

That the patient feels these deficiencies in the present N.H.S. *with its emphasis on the hospital* is surely one reason why, if he can afford it, he is turning to private practice and private insurance. What would happen if the private sector should materially expand, as envisaged by Dr. Lees and others, can be seen by reference to the B.M.A. Dawson report, the Collings report, and Professor Eckstein's book on the National Health Service.

The College of General Practitioners has recently shown increasing interest in the role of the G.P. in preventive medicine and collaboration with the local-authority health services. Could not a joint approach be made by the doctors in general practice and local-authority services to the whole problem of community care and on this basis some rethinking be made on the basic organisation of the National Health Service?

Birmingham. M. BARROW.

SIR,—May I make three comments on Dr. Seale's excellent review of my monograph, *Health Through Choice*, in your issue of Oct. 28?

1. I find it illuminating that from widely different standpoints—those of doctor and economist—Seale and I should independently reach the conclusion that the present structure of the National Health Service is unsound and, at the same time, share a wide measure of agreement on the direction of reform. We may both be wrong: that possibility should certainly not be ruled out. I am sure that neither Seale nor I would claim to have divined the secret of "the finest health service in the world". But this experience suggests that the traditional divorce between medicine and economics is false and inhibits deeper understanding of the diverse ways to better medical care.

2. There is less disagreement between us than Seale supposes when he says that "most medical services should be available free of direct charge to patients". I would agree with this and I envisage its being achieved through the development of private health insurance together with Government funds at strategic points, leaving only minor medical expenses to be met directly by the patient. The real difference between us is that Seale would continue to rely on taxation to meet medical costs, whereas I would seek to replace taxation by private insurance. I doubt whether medicine can be freed from political controls as long as it is financed predominantly by taxes.

3. I cannot agree that medical-care services differ from other commodities because "usually people do not want to consume them at all". For that statement to mean anything, we must assume that people are indifferent as between health and sickness and as between being alive and being dead. This is hardly typical human behaviour. But if we assume that people prefer health to sickness and life to death, and if we further suppose that medical-care services are a means to health and life, then we must logically conclude that people *do* want to consume them.

Dr. Seale is nearer the mark when he says "most people would rather not use medical-care services"—a very different statement altogether. But this is not peculiar to medical care. I would rather not travel to London to see Dr. Seale, but if I wish to see him I must consume transport services. Most people would rather not consume tube and bus services during rush hours but if they want to get to and from work they must do so. Most women would rather not sit for hours going through all the tortures of beautification but they must (or feel they must) if they wish to be beautiful. And so on.

The idea that medical care is unique among commodities bought and sold in the market has perennially dogged rational analysis, though understandably this is an issue on which economists and doctors will find it hard to agree. My hope is that economists will not therefore be thought lacking in humanity because they attempt to combine feeling with rational thought.

University College of North Staffordshire, Keele, Staffordshire. D. S. LEES.

EMERGENCY RESUSCITATION

SIR,—Mr. Frewin's letter of Nov. 4 raises two questions which are often posed by doctors as well as by laymen. Your answers while valid are not the only ways out of the dilemma.

(1) *How does one extend the head, pinch off the nose, and hold the tongue forward with two hands?* If the left thumb is inserted between the lower teeth and the tongue and the whole lower jaw hooked forward, this will extend the head and pull the tongue away from the posterior pharyngeal wall in one movement leaving the right index finger and thumb for pinching off the nose. In the two cases where I have had the opportunity to try this technique not the slightest difficulty was experienced in maintaining the seal provided the thumb was well flexed and was assisted by the left index finger crooked under the symphysis menti.

(2) *The hazard of overinflating the patient.* I would question your advice to "blow vigorously in the adult". It is not necessary. One of the patients referred to was a heavily built man of 14 stone, and I was astonished at the ease with which his chest could be inflated. One must remember the work of Mushin and Morton [1] who found that inflation pressures below 15 cm. water never and over 20 cm. water occasionally inflated

1. Mushin, W., Morton, H. J. V. *Brit. med. J.* 1958, i, 215.

the stomach. Vigorous inflation certainly increases the risk of regurgitation, but of course the efficacy of any pressure used must be related to its observed effect. If high pressures have to be used, it might be wiser to re-examine the pharynx for debris or dentures and to pay more attention to the airway. My " vigorous blow " measures 20 cm. water.

St. Helier Hospital,
Carshalton, Surrey. D. M. DAVIES.

CONGENITAL THROMBOCYTOPENIA

SIR,—I read the article by Dr. Gwynfor Jones and others (Nov. 4) with interest, but I was surprised to note that steroid therapy was not given to the mother before delivery. This has been described by Watson [1] in Britain and by Tancer [2] in the United States. The administration of steroids to the mother before delivery seems to prevent the baby from being affected.

Surely it is more rational to have the child born in good condition, than to have to give steroids for two weeks to a child with a dangerously low platelet count. Although the majority of affected babies survive, some die very soon after birth, and could probably not be saved by steroids given after delivery. It would be interesting to apply these new techniques of measuring platelet antibodies while treating the mother with steroids, and to correlate the results with the child's condition at birth.

Department of Midwifery
and Gynæcology,
University of St. Andrews,
Dundee. MARTIN LEE.

ADVERTISEMENTS FOR HEALTH

SIR,—Mr. Caspar Brook (Nov. 4) still does not explain why the present members of Consumers' Association feel unable to trust an examining body that accepts examination fees. Financial dependence on such an exceptionally sceptical or critical minority of the public restricts the scope of this otherwise excellent organisation.

Which? is powerless to counter cigarette advertising, either by adverse publicity or by persuading the public and the industries concerned to change to more valuable forms of production and consumption.

What is needed is an organisation with the enthusiasm, talent, and influence of a great advertising agency, the power of a public monopoly like I.T.V., and the integrity and moral standards of an official or judicial examining body. It would persuade those who need or want persuasion, inform those who need or want information, and discover whatever needs to be known about the wants and needs of consumers and the means of satisfying them. I.T.V. or any one large advertising agency could if it wished establish for itself a reputation with the public for exceptionally high standards while not losing but rather gaining a reputation with industry for persuasive selling power. Such an agency could afford to be more comprehensive than the Consumer's Association and less subject to special pressure groups than any agency, medium, or organisation except perhaps the churches and the judiciary, which incidentally do not quite disdain to use display, ceremony, and even sometimes humour to help in the performance of their duties.

Any medium or agency unwilling or unable to compete in the field of consumer reputation for reliability would become more and more dependent on disreputable products, and would remain ashamed to advertise itself to the public.

London, S.W.10. R. B. D. STOCKER.

1. Watson, P. S. *J. Obstet. Gynæc. Brit. Commonw.* 1959, **66**, 124.
2. Tancer, L. M. *Amer. J. Obstet. Gynec.* 1960, **79**, 148.

SURGERY IN EMPHYSEMA

SIR,—The letter of Nov. 4 from Mr. Belcher and Dr. Capel is timely, and I should like to support it strongly and to plead for the wider use of excision of large air cysts of the lungs. Without delving into pathogenesis, I think there is little doubt that the respiratory disability of these patients can, in selected cases be improved by removing the cyst, and most chest physicians will know of cases in which this has gratifyingly occurred.

I agree with Mr. Belcher and Dr. Capel also that such patients should not be denied the opinion of a thoracic surgeon, but one of my problems has been that the opinion of a thoracic surgeon is about as far as the consultation on the case gets, and I suspect that the number of cases operated upon is small because they are not being accepted by the surgeon. To put it bluntly, it is hard to persuade the thoracic surgeons to do the job.

My second point is to plead also for simple and straightforward tests of respiratory function in these patients. The results should of course be tempered by the clinical findings. Such tests could indicate quantitatively the airway resistance, which is always high. Indeed, estimation of forced expiratory volume often supports the hypothesis that the patient's bronchial tubes are wrapped around by elastic tissue which has lost its tension, and thus in removing a large air cyst one would be taking out a proportion of the patient's dead space which can only be of benefit in diffuse airway-obstruction disease. In many cases the arterial gas figures do not seem to reflect this disease, although the oxygen pressure is low, and it is remarkable how clinical examination and respiratory-function tests lead one to the opinion that the patient's thorax can do much to keep up normal ventilation against a big resistance, and that the thoracic surgeon can help the patient to do this if a large cyst is removed.

Grove Park Hospital,
London, S.E.12. M. M. NAGLEY.

THE DUMPING SYNDROME

SIR,—Mr. Cox and Mr. Allan (Sept. 23) gave evidence that the dumping attack may be associated with a dilatation of blood-vessels in the toes. They conclude that there is a striking peripheral vasodilatation during the attack. Similar findings were obtained by Hinshaw et al.[1] Recently it has been shown that there is a considerable increase in the blood-flow through the splanchnic vessels.[2] It is also known that the dumping attack may be accompanied by a decrease in the volume of circulating blood-plasma.[3] In view of all these changes tending to lower blood-pressure it is surprising that the fall in blood-pressure observed by Cox and Allan is so moderate. Other authors have recorded an increase in systolic pressure during a dumping attack.[4]

We have studied the peripheral circulation by means of venous occlusion plethysmography in 10 patients, who had had a gastric resection. In the sitting position the blood-flow through one hand and one calf was measured and at the same time volume changes in the other calf were recorded without venous occlusion. Measurements were made before and during a dumping attack provoked by hypertonic glucose. In 9 subjects the cardiac output was measured with the indicator dilution technique and the blood-pressure recorded in the brachial artery.

The resistance to blood-flow through the calf (mainly muscular tissue) increased during moderate or severe dumping symptoms. The volume of the calf (without venous occlusion) regularly decreased, indicating a constriction of " capacitance " vessels. The changes in resistance to blood-flow through the

1. Hinshaw, D. B., Joergensen, E. J., Davis, H. A., Stafford, C. E. *Arch. Surg.* 1957, **74**, 686.
2. Castenfors, H., Eliasch, H., Hultman, E. *Scand. J. clin. Lab. Invest.* 1961, **13**, 512.
3. Roberts, K. E., Randall, H. T., Farr, H. W. *Surg. Forum*, 1953, **4**, 301.
4. Borgström, S. G. *Acta chir. scand.* 1960, suppl. 265.

hand (mainly reflecting changes in skin blood-flow) were variable. In 4 cases the resistance increased and in 4 it decreased. Cardiac output increased by 0·5–3 litres per min. in 8 of 9 cases examined. In the 9th case the cardiac output decreased, and this patient was the only one who had a vasovagal reaction with a fall in blood-pressure.

The patient with the dumping reaction presents a picture which is in many ways similar to that of shock; his blood-volume is lowered, he feels drowsy and sweating. It is therefore surprising that the "circulatory failure" is characterised by a high cardiac output. The high output may be regarded as a compensatory reaction to a lowered "total peripheral vascular resistance". The vasodilatation in the splanchnic vascular bed may be a "local" response to a meal. The "distant" vasodilatation in the skin is more intriguing and could be caused by a humoral agent.

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S.-E. LINDELL
O. THORÉN
H. WESTLING.

Sahlgren's Hospital,
Göteborg, Sweden.

CHROMOSOMES OF A METASTATIC HUMAN CANCER

SIR,—Boveri's theory that cancer might be due to alteration in the number or form of the chromosomes is no longer widely held. Bayreuther has recently reviewed [1] the available evidence and concludes that the theory is mistaken, but in so far as solid human cancers are concerned the Boveri theory has not been ruled out to everyone's satisfaction. Galton and Benirschke have reported 46 chromosomes in cultured cells from colonic metastases of an ovarian teratoma.[2] McKusick [3] has questioned the evidence, however, presumably because the cells were apparently trypsinised and chromosome squash preparations were done on the cell suspensions. This method would tend to obliterate the distinction between fibroblasts and epithelial cells. We should like to report an experiment which avoided this difficulty.

In the case here reported, tissue fragments were explanted in small plasma clots. The media and culture conditions were those recommended by the department of biophysics, University of Colorado Medical School.[4] The tissue used was a portion of a cervical lymph-node containing papillary and follicular thyroid carcinoma. This setting, as well as the papillary structure and the residual lymph-node architecture observed in the tissue sections, seems to rule out the remote possibility of co-called "lateral aberrant thyroid".

Several of the explanted fragments gave rise to epithelial (or "epitheloid") outgrowths while others resulted only in fibroblast-like cells. Epithelial outgrowth is readily distinguished from the usual fibroblast type (fig. 1). The epithelial cells are polygonal and form a mosaic sheet, while the nuclei tend to be circular rather than elongated. We presume that the epithelial cells represent the cancer since in our experience normal lymph-nodes never produce epithelial sheets in tissue culture. (In fact, benign thyroid tissue rarely if ever produces any growth but fibroblast-like cells in vitro.)

Although fibroblast outgrowth was sometimes seen adjacent to the epithelial sheets, there was in general no admixture of cell types. Only metaphase plates deep within the epithelial monolayers were used for counts. The technique for chromosome preparations was a modification of those of Leheune [5] and Puck and his collaborators.[4]

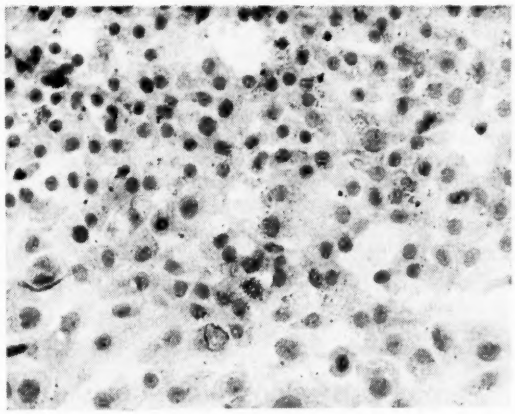

Fig. 1—Monolayer of epithelial cells at the edge of an explanted fragment.

Primary explants are probably advisable in studying tumour karyotypes (despite the smaller number of dividing cells thus made available) since later passages run the risks of obscuring the cell types and of fibroblast overgrowth. In this case 8 mitotic figures were countable but only 1 figure was adequate for karyotype analysis. The counts gave 3 figures with 45 chromosomes, and 5 with 46. The experience of many investigators [6] with cultured benign cells may justify the assumption that the 45 counts are artefacts, and we assume that they represent overlap of small chromosomes by larger ones. Fig. 2 shows a chromosomal array consistent with a normal female karyotype.

Fig. 2—Chromosomes arranged according to the Denver conventions. Two of the chromosomes (postulated homologues for a no. 3 and an X) are folded over. Within most of the rows the ordering of the chromosomes is somewhat arbitrary. Apparent differences in arm length between homologues is at least partly attributable to the fact that the arms are not always parallel to the optical plane. Not all the chromosomes are easily made out in the same focal plane.

1. Bayreuther, K. *Nature, Lond.* 1960, **186**, 6.
2. Galton, M., Benirschke, K. *Lancet* 1959, ii, 761.
3. McKusick, V. A. *J. chron. Dis.* 1960, **12**, 1.
4. Members of the Department of Biophysics, Quantitative Mammalian Cell Culture. Denver: Department of Biophysics, University of Colorado Medical Center, 1960.
5. Lejeune, M. J., Turpin, R., Gauthier, M. *Rev. franç. Ét. clin. Biol.* 1960, **5**, 406.
6. Court Brown, W. M., Jacobs, P. A., Doll, R. *Lancet*, 1960, i, 160.

It is of course possible that some small chromosomal aberration is present, but this reservation is no more than must be made about nearly all current reports of normal human karyotypes. It is of interest that the tumour nuclei in vitro exhibit a relatively high incidence of Barr (sex-chromatin) bodies. In addition the nuclei are fairly uniform, as is so common in thyroid carcinoma. Indeed, the deceptively benign appearance of the nuclei in many thyroid carcinomas is often a diagnostic stumbling block, and to find in them morphologically unremarkable chromosomes will perhaps come as little surprise to the pathologist.

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CHARLES P. MILES
ROBERT E. GALLAGHER.

DOWN'S SYNDROME (MONGOLISM)

SIR,—Landon Down's original description of mongolism appeared in a paper entitled "Observations on an ethnic classification of idiots". The features of various groups of "idiots and imbeciles" were compared to the facial appearance of the inhabitants of quite a number of countries other than Mongolia. Thus, Ethiopians, Malayans, and the original races of North America are all mentioned in this connection.

This classification has, of course, little merit and should be abandoned along with the term mongolism. Down undoubtedly made a shrewd and important observation, however, in noting the "mongolian type of idiot", and it is right that his name should be honoured eponymously. Our Russian colleagues have in fact used the term Down's syndrome, or disease, for many years and I suggest we follow their lead.

London, W.5. A. HOLLMAN.

GLUCOSE-6-PHOSPHATE-DEHYDROGENASE DEFICIENCY

SIR,—Using Motulsky's screening technique on capillary blood samples, Dr. Engleson and Dr. Kjellman (Oct. 21) find that glucose-6-phosphate dehydrogenase (G.-6-P.D.) activity in infants' red cells is slightly less than that in adult life. While these findings are of great interest, it should be pointed out that the Motulsky method, though of great value in the detection of subjects with very low or absent enzyme activity, has not proved to be so reliable in the detection of intermediate ranges of activity. Furthermore, the great variation in hæmatocrit values of capillary blood samples in infancy might be reflected in some slight variation in enzyme activity when assayed by this method. More sensitive spectrophotometric assay methods[1] do give consistently high values for G.-6-P.D. activity in infancy and it would be of great interest to know the results of such assays on the infants studied by Dr. Engleson and Dr. Kjellman.

It is not surprising that G.-6-P.D. deficiency has not been found in association with unexplained neonatal icterus in Sweden since this genetically controlled enzyme deficiency is probably very uncommon in North Europe. Reports from Singapore,[2,3] Greece,[4] Italy[5] and Nigeria,[6] have all pointed to such an association and the recently reported excess of infant over adult deficient subjects in Greece[7] suggests that these infants are at a real disadvantage. It is still not established whether or not hæmolysis can occur in the absence of a sensitising mechanism, but recent studies have shown that the red-cell survival-time in non-sensitised enzyme-deficient Negro adults is definitely shortened.[8] The results of similar studies on enzyme-deficient infant red cells will be of great interest.

Hematology Division,
Johns Hopkins Hospital,
Baltimore. D. J. WEATHERALL.

1. Zinkham, W. H. *Pediatrics*, 1958, **22**, 453.
2. Smith, G. D., Vella, F. *Lancet*, 1960, i, 1133.
3. Weatherall, D. J. *ibid.* 1960, ii, 835.
4. Doxiadis, S. A., Fessas, P., Valaes, T., Mastrokalos, N. *ibid.* 1961, i, 297.
5. Panizon, F. *ibid.* 1960, ii, 1903.
6. Gilles, H. M., Taylor, B. G. *Ann. trop. med. Parasit.* 1961, **55**, 64.
7. Zannos-Mariolea, L., Kattamis, C. *Blood*, 1961, **18**, 34.
8. Brewer, G. J., Tarlov, A. R., Kellermeyer, R. W. *J. Lab. clin. Med.* 1961. **58**, 217.
9. See *Lancet*, Oct. 21, 1961, p. 925.

THE CATARRHAL CHILD

SIR,—In his interesting book,[9] Dr. Fry drew certain conclusions from his experience which would appear to apply to the whole of this country. In fact the only valid conclusion which can be made applies to the situation in Beckenham, Kent, where this work was done. The problem in other parts of England and in particular in the industrial areas of the North is an entirely different one, and it is most important that this fact should be appreciated.

The College of General Practitioners, through their periodic surveys, are in a unique position to carry out research of this type, and this has already been done in certain parts of Great Britain. It is to be hoped that a complete survey will eventually be made from which it will be possible to draw accurate conclusions.

Doncaster. PHILIP H. BEALES.

PULMONARY EMBOLISM

SIR,—I was interested in the article of Nov. 4 by Dr. Stevens, in which he discusses the problem of "unheralded pulmonary embolism" in patients who are active and ambulant when chest symptoms begin. Last year I had under my care a patient in whom this dangerous disease had apparently been precipitated by drug treatment.

An unmarried nursing sister enjoyed good general health and was in charge of a busy surgical ward. She was aged forty, and had recurrent endometriosis, for which she had had a laparotomy eight years ago, and subsequent courses of methyltestosterone. During an exacerbation of symptoms treatment was advised with a pseudopregnancy course of 'Enavid' (norethynodrel and ethinylœstradiol 3-methyl ether). Treatment was started with the recommended dose of one tablet (10 mg.) daily for two weeks, followed by two tablets (20 mg.) daily for two weeks. This treatment provoked nausea and vomiting, and she was therefore also given two antiemetic drugs, cyclizine hydrochloride and perphenazine. Despite these measures, a daily dose of 20 mg. caused continued vomiting, and so all treatment was stopped. Vomiting ceased three days later, and for a further week she ate well and led an active country life.

Unfortunately on the tenth day after stopping enavid a severe right-sided pleurisy suddenly developed, and one week later she had a sudden left-sided pleurisy. Treatment with penicillin and tetracycline had little effect, but her condition slowly improved. The diagnosis of bilateral pulmonary embolism with infarction was subsequently confirmed by chest X-ray and electrocardiograph, which showed inversion of T waves in leads 2 and 3 and V_1. Three months later the chest X-ray and E.C.G. had returned to normal. There was no clinical evidence at any time of venous thrombosis in the legs or pelvis, and she had not been confined to bed before the onset of pulmonary embolism. Presumably she had a silent thrombosis secondary to the dehydration and vomiting caused by enavid.

As accompaniments to treatment with norethynodrel, nausea is common, and vomiting not uncommon. The makers suggest ways in which the nausea may be mini-

mised, and Dr. Venning, their medical director, repeated in your columns (Oct. 28) the undesirable consequences of premature interruption of enavid treatment. Because enavid may produce uncontrollable vomiting and provoke pulmonary embolism and infarction, I would counsel caution in the use of this widely advertised drug.

Bungay, Suffolk. W. M. JORDAN.

SIR,—The letter from Dr. Churcher (Nov. 11) seems to imply that the earliest site of thrombosis is in the upper part of gastrocnemeii. I think many will dispute it. A daily ritual by the residents (on the surgical units at least) of systematically palpating both legs is much more likely to yield fruit by spotting postoperative thrombosis of deep veins.

Incidentally, it is hard to explain why heparin, which is only an anticoagulant, should so dramatically relieve tenderness. After all, four hours is too short a span of time to permit lysis of clot by natural mechanisms.

Gulson Hospital, Coventry. J. K. ANAND.

NOMENCLATURE IN GENETICS

SIR,—The nomenclature of specific clinical syndromes due to chromosomal aberrations ought to be uniform, as Dr. Gall [1] maintains. It is my impression that the best way would be to call them by the name of the main authors involved: trisomic 17-18 would be called Edwards' syndrome, trisomic 13-15 Patau's syndrome, and so on. This would avoid some confusion until the autosomes are exactly determined.

Laboratório de Genética Humana, Universidade do Parana, Brasil. HOMERO BRAGA.

PREGNANCY AND MALIGNANT MELANOMA

SIR,—Dr. Magnus (Oct. 7) questioned several points in your leading article of Sept. 9 concerning the effect of pregnancy upon melanoma. But he did not refer to two statements in both the papers quoted.

Firstly, in both analyses women were included who became pregnant within one year before diagnosis and five years after diagnosis. A similar period was scanned for pregnancy in the non-pregnancy group. It would therefore seem that similar periods in the history of the disease in the pregnant and non-pregnant groups were covered. Further, in the last paragraph before comment in our paper, we stated that we plotted survival figures for each patient, in both pregnant and non-pregnant groups, to compare length of survival. The same number of women died in the first year after diagnosis in the two groups.

Dr. Magnus's second point, mentioned in our paper, was that those women who were more ill might be less likely to become pregnant is certainly valid, but we do not know of any way this could be controlled. When we compared five-year survivals in pregnant and non-pregnant groups, divided into the stage of the disease, only in those patients with localised disease was there significant five-year survival, and this was slightly better in the pregnant than in the non-pregnant group. It would be difficult to distinguish a doomed patient with localised melanoma from one whose disease has been removed completely, and we cannot, therefore, explain the similarity in survival in the two groups on the basis of one group, being less ill, choosing to become pregnant.

For Dr. Magnus to conclude that the lack of significant difference in five-year survival in the pregnant compared with the non-pregnant patients with melanoma indicated a harmful effect of pregnancy seems totally unwarranted.

Children's Cancer Research Foundation, Inc. Boston, Massachusetts. LAURENS P. WHITE.

1. *Lancet*, 1961, i, 673.

FROM WORDS TO WARDS

SIR,—In *From Words to Wards* of your issue of Oct. 28, the message of words is profound, succinct, and has stirred at least one administrator.

Those of us south of the Border responsible for the programme of hospital building, if we are honest with ourselves, must share the concern that your contributors express. The needs of a human hospital and the ways and means for satisfying them are indeed complex. I would support " the early establishment of a research organisation with adequate resources to initiate experimental inquiry and field studies, and with the freedom of action customarily permitted to research councils ", but my plea is that its members be men and women in touch with the realities of birth, life, and death in the machinery of a hospital.

JAMES FAIRLEY
Senior Administrative Medical Officer,
London, W.2. South-East Metropolitan Regional Hospital Board.

SELECTIVE VAGOTOMY AND POST-VAGOTOMY DIARRHŒA

SIR,—The findings of Mr. Elliot-Smith and his colleagues (Nov. 4) concerning the incidence and severity of diarrhœa after vagotomy and after gastrectomy differ from those of some other workers. Clark [1] found both greater after vagotomy. So too have we at the West London Hospital. The report of the National Committee on Peptic Ulcer of the American Gastroenterological Association [2] confirms this increased incidence.

Although the contents of the Oxford letter suggest that there is no important difference between the incidence of diarrhœa and pale stools after any of the gastric operations, yet we are told " diarrhœa with frequent loose motions and sometimes extreme urgency and difficulty of control does occur after vagotomy but its incidence is low (2–3%) ". If this is true—and it is—would we not expect a further percentage of less severe yet troublesome cases?

I support vagotomy in the treatment of chronic duodenal ulceration. I believe that gastric resection has no place in this disease. Yet I would be anxious about the operation if an agreed incidence (2–3%) of very severe diarrhœa and a further perhaps 4–5% of troublesome diarrhœa could not by some means be prevented.

Elliot-Smith et al. are right when they state: " It seems important to define accurately what is meant by diarrhœa. . . ." I think it is because we differ here that we in part disagree. Their definition is " three or more motions daily with loose, watery stools, often urgency or near incontinence . . .". Our experience is that although there is some improvement in these cases over the years, disability persists probably for life. This is indeed a very disturbing state of affairs, and even 2–3% is a serious complication of an operation for simple ulcer.

In all our studies we have found that the usual pattern is one of attacks with 2–4 liquid pale stools daily with urgency. These attacks last for a few days and occur perhaps every few weeks. There is also an early morning pattern with several urgent liquid motions, after which the patient is free from trouble for the day. Some of these patients have great fear of an uncontrolled bowel action before they reach their place of work. The more serious of these cases, added to the 2–3%, bring the incidence of important diarrhœa to a somewhat higher figure.

I do not wish to overemphasise the diarrhœa problem, but we must not shut our eyes to it. I believe that anterior selective vagotomy, bearing in mind the detailed anatomy of the hepatic

1. Clark, C. G. *Brit. med. J.* 1961, ii, 1250.
2. *Gastroenterology*, 1952, **22**, no. 3.

plexus, prevents diarrhœa and maintains the normal colour of the stools, and that there is good evidence for this from a careful observation of the stools in the ward before the patient is discharged from hospital as well as from later studies.

Several years must pass before this matter is finally settled to the satisfaction of most surgeons. Physiological experiments on man or on animals will not give us the answer to this problem. Nothing will replace careful clinical observation, both in the ward and later.

West London Hospital,
London, W.6. HAROLD BURGE.

LANGUAGE: THE LOST TOOL OF LEARNING

SIR,—Sir George Pickering (July 15) would like us to say " kidney cutting " instead of " nephrectomy ". But is this an improvement? To me it sounds more like the language of the butcher's shop than the operating-theatre.

Fowler tells his readers to prefer the Saxon word to the Romance. But why? Just as Italian is a more beautiful language than German so are our Romance words more beautiful, or more " refined ", than our Saxon ones. Fowler's advice might do for the editor of a Sunday newspaper but not, surely, for the editor of a professional journal.

Ever since sheep became mutton when served at table, Romance words have been the language of culture. Let it continue to be so.

South Pacific Commission,
Noumea, New Caledonia. W. NORMAN-TAYLOR.

THE BRACHIAL NEUROPATHIES

SIR,—The recent paper by Dr. Lishman and Dr. Ritchie Russell (Oct. 28) is very useful and helps to throw a clearer light on the problem of pain in the arm. There is no doubt that some folk react to discomfort differently from others, and that irritation of any one nerve lowers the threshold of pain in areas supplied by neighbouring nerves, especially if associated with the same plexus formation. Tension within ligaments and intervertebral discs resulting from changes in fluid and electrolyte contents plays some part as shown by Lewis and Kellgren,[1] and it is tempting to think that fascia may be affected in the same way so that where a nerve lies between it and bone, or penetrates it, this variation in tissue tension when it leads to swelling causes some nipping of the nerve; in pregnancy these phenomena happen at the wrist amongst other places, and may initiate the carpal-tunnel syndrome.

The authors refer to one of my own papers on this subject, but it was written almost twelve years ago, based on experience of the previous twenty years, and was therefore before the significance of cervical spondylosis and of the carpal-tunnel syndromes had been pointed out, which appreciation immediately removed from the costoclavicular space many imaginary causes for brachial neuropathy. I refer to such suggestions as hypertrophy of scalenus anticus; thickenings within Sibson's fascia; post-fixed plexus; and nipping between the clavicle and normal first rib. In more recent lectures and a paper,[2] I have pointed out how much these contributions of Brain and his colleagues have done to remove from the costoclavicular space blame for these difficult cases of pain in the distribution of the brachial plexus.

As one who had the privilege of working for a year with the late Dr. A. W. Adson, whose writings on cervical rib are still some of the clearest, though, like others of that day, he thought that other mechanisms in the costoclavicular space besides cervical rib and cervical band could cause pain in the arm. I now feel most strongly that the pain caused by either of these two abnormalities is absolutely clear-cut and that discomfort not conforming to this pattern is not due to cervical rib or band, even though one be present. It is well recognised that half the possessors of cervical ribs suffer no symptoms. Pain of cervical rib origin conforms with the anatomical distribution of the inner cord of the brachial plexus or, at least, does so in the earlier stages of the complaint—i.e., pain along the inner border of the forearm and hand, with or without corresponding sensory and/or motor involvement. Once this pain has developed there may be subsequent overflow into wider areas, though in my experience, rarely into the upper arm. Of course, coincident spondylosis adds greatly to the difficulty of analysis. In my earlier days I was sometimes pressed, because of the presence of cervical ribs, into operating on patients who complained of pain in the region of the shoulder and arm, sometimes spreading up into the neck and down, rather vaguely, below the elbow—it did no good whatsoever. Perhaps the failures attributed by Wilson[3] to faulty technique were in patients of this kind.

This precision of pain pattern is so significant that where a patient complains of pain confined to the inner cord area and, in addition, suffers corresponding motor and/or sensory defects, and has failed to respond to conservative measures, I do not hesitate to advise exploration of the supraclavicular fossa even where X-rays fail to show a cervical rib, since it is then almost certainly due to a thick sharp-edged fibrous band in the inner border of scalenus medius between which and scalenus anticus the cord is compressed. A tell-tale sign is that the 7th cervical transverse process is as long as, or slightly longer than, the 1st dorsal transverse process. Excision of this " cervical band " abolishes the pain. I have always found the post-fixed plexus explanation difficult to accept.

In like manner, I believe that a true carpal-tunnel compression of the median nerve causes, in the earlier stages, pain of precise distribution, though it tends to overflow into the rest of the hand and forearm later on, and many patients admit to this. Any sensory or motor disturbance of median-nerve innervation strengthens this diagnosis, and where conservative treatment fails, operation is indicated: but it is interesting how many carpal-tunnel patients do seem to get better quickly on one or other of the devices described by Lishman and Ritchie Russell.

Department of Surgery,
Queen Elizabeth Hospital,
Edgbaston, Birmingham, 15. F. A. R. STAMMERS.

SIR,—It was very interesting to read of Dr. Lishman and Dr. Ritchie Russell's work on the brachial neuropathies. They hope that their study will be compared with other investigations. Such an investigation was, indeed, carried out on 112 cases of pain described as muscular rheumatism, " fibrositis ", &c., 58 of whom had pain in the neck, shoulder, arm, or forearm, and it is interesting to compare the findings. The fact that this pain could be removed by a relaxation technique and reinduced by forcing the muscle back into contraction, demonstrates that somatic pain is due to excessive muscular contraction.[4]

From this investigation, and from further experiments,[5] it was concluded that deep pain (as opposed to cutaneous pain sensations which have their own recognised receptors in the free nerve-endings) was of two qualities—aching and burning.

The proposed " true " stimulus to deep pain was contraction or stretching of smooth or somatic muscle; the receptors to the aching quality (when the muscle is contracted) are the Golgi tendon organs, which were found to be localised exactly in the same place as the so-called myalgic spots; the receptors to the burning quality (when the muscle is stretched) are the muscle

1. Lewis, T., Kellgren, J. H. *Clin. Sci.* 1939, **4**, 47.
2. Stammers, F. A. R. *Bull. post-grad. Comm. Med. Univ. Sydney*, 1954, **14**, 347.
3. Wilson, C. A. K. Textbook of Neurology. London, 1940.
4. Draspa, L. J. *Psychiat. Neurol., Basle*, 1961, **141**, 367.
5. Draspa, L. J. *ibid.* p. 202.

spindles. In both instances, overstimulation of the muscle kinesthetic receptors evoked pain.

Contraction of a muscle can be initiated by covert behaviour, chemical, thermal, or mechanical factors; the basic factor in "clinical pains" was shown to be covert behaviour.[6]

Stretching of a muscle, being a passive affair, rarely occurs spontaneously. It can, however, be initiated by locomotor derangements and "outside" agents—as happens, for instance, in inflammation, causalgia, and dropped metatarsal arch.[5]

Referred pain was also examined and found to be due to additional muscles in contraction, removed from the initial site of pain or injury and, as a rule, their involvement constituted a protective pattern of behaviour.[4]

It may be of interest to note that in some patients with muscular rheumatism, paræsthesia was caused by pressure on a nerve as it passed through, or under, a tense muscle.[7]

Deva Hospital, Chester. J. DRASPA.

URINARY EXCRETION OF UROCANIC ACID IN MEGALOBLASTIC ANÆMIA

SIR,—I was interested by the letter from Mrs. Bennett and Dr. Chanarin (Nov. 11) about the excretion of formimino glutamic acid (F.I.G.L.U.) and urocanic acid after a histidine load.

It seems likely that they may have given an erroneous impression by their statement that both these substances appear not only in the urine of normal subjects but also in a variety of diseases. This, of course, is true, but it seems reasonable to emphasise that there is a wide quantitative variation. Under controlled experimental conditions it has been found that the excretion of F.I.G.L.U. after a histidine load can be significantly increased in folic-acid-deficient patients but not in normals.[8 9]

Whilst some degree of overlap with normals might be expected, this seems rare except when following the results of treatment with folic acid. The reason for this we believe to be due to the fact that the histidine load test is not measuring the total body store of folic acid but rather a precursor of the storage form of folic acid (probably tetrahydro folic acid) which only has a transient existence in the presence of depleted body stores.[10]

The excretion of F.I.G.L.U. after a histidine load test is very common in idiopathic steatorrhœa (52 out of 54), whilst the incidence of abnormal tests in the various other diseases measured by Bennett and Chanarin varies widely. Thus in 25 cases of untreated pernicious anæmia the excretion of F.I.G.L.U was usually normal if the hæmoglobin exceeded 60% (8.9 g. per 100 ml.).[11] 6 out of 25 patients with post-gastrectomy steatorrhœa and 5 out of 64 patients with iron-deficiency anæmia (uncomplicated by steatorrhœa, partial gastrectomy, or pregnancy) also have abnormal tests. The reasons for this are not as yet clear, but there is certainly no correlation with the degree of anæmia.[12 13]

As urocanic acid (proper name: imadzole acrylic acid) is an intermediate between histidine and F.I.G.L.U. it might be expected to accumulate pari passu with F.I.G.L.U. perhaps as a result of feedback control. Undoubtedly this happens in a large number of cases and, as Bennett and Chanarin point out, the quantity excreted is somewhat capricious. This also applies to F.I.G.L.U. in folic-acid deficiency, though not in vitamin-B_{12} deficiency.[10]

Urocanic acid is easily detected by high-voltage electrophoresis on cellulose acetate with a pH 6·4 buffer or by paper chromatography[11] and staining with Pauly's sulphanilic acid reagent.[11] Using these techniques we have found that of 88 patients excreting an excess of F.I.G.L.U., 33 also excreted an excess of urocanic acid. 10 other patients out of 250 excreted urocanic acid who did not excrete F.I.G.L.U.

Whilst the excretion of urocanic acid is an interesting observation, it does not seem to have any clinical value.

University College Hospital Medical School, London, W.C.1. J. P. KNOWLES.

ANTICOAGULANTS IN ACUTE MYOCARDIAL INFARCTION

SIR,—The important conclusions of Hilden et al.[1] are provoking much discussion in many hospitals in this country where anticoagulation with heparin and phenindione is standard therapy in the acute phase of myocardial infarction. Most units are loth to give anticoagulants to those over 70, but this is probably unwarranted prejudice if only in view of the reduction of morbidity and mortality by anticoagulants in the elderly resting in bed.[2]

Have the Copenhagen workers taken their own forceful advice and discontinued anticoagulant therapy in patients with myocardial infarction? I can nowhere see this mentioned in their article, or subsequent correspondence.

Dorking General Hospital, Dorking, Surrey. A. R. F. WILLIAMS.

SIR,—Dr. Poller's letter of Oct. 28 states that anticoagulants combined with heparin may not be up-to-date therapy. I have found that the most effective treatment is exposure to wet heat combined with refrigeration to the neck to reduce the temperature of blood in the cerebral circulation.[3]

Exposure to wet heat will cause an immediate increase in prothrombin-times, and sometimes plasma from patients who have been exposed to wet heat for twenty minutes will fail to coagulate.[4] 6 mg. of phenprocoumon ('Marcoumar'), a long-acting anticoagulant, is given before heat treatment, and immediate relief of pain is the rule. Patients are then wrapped in plastic and put in a special sweat bed, keeping skin temperatures at 90°F, and phenprocoumon (3 mg. daily) is given for another two days. I have found no evidence of bleeding even when prothrombin-times rise to 50 seconds.

Tunbridge Wells. E. F. ST J. LYBURN.

HYPOTENSION DUE TO AN ADRENALINE-SECRETING PHÆOCHROMOCYTOMA

SIR,—I read with great interest about the diagnostic difficulties which Dr. Richmond and his colleagues (Oct. 21) encountered in a case of adrenaline-secreting phæochromocytoma. We have recently seen a patient with the same rare tumour who had hypotension and was admitted in shock. Quite incidentally, we reached the diagnosis by observing a hypertensive crisis after a histamine test of gastric function.

In February, 1961, an obese woman, aged 65, was admitted in shock. She was conscious, but so critically ill that she could not give any information. She vomited slightly, and the vomitus was black and gave a positive benzidine reaction. The skin was pale and cold, but not clammy. Blood-pressure was 100/70 mm. Hg; the pulse was weak at a rate of 136. Temperature 102°F (38·9°C); respiratory rate 26; hæmoglobin 20·2 g. per 100 ml.; serum-creatinine 1·8 mg. per 100 ml. The urine contained sugar and gave a strong protein reaction.

In 1915, the patient had been admitted to hospital with a bleeding peptic ulcer; but she did not have an operation, and had had no gastrointestinal symptoms since. During the past ten years she had noticed moderate dyspnœa on exertion and had had occasional attacks of angina pectoris.

6. Draspa, L. J. *Brit. J. med. Psychol.* 1959, **32**, 106.
7. Draspa, J. *Lancet*, 1960, i, 831.
8. Luhby, A. L., Cooperman, J. M., Teller, D. N. *Proc. Soc. exp. Med. Biol. N.Y.* 1959, **101**, 350.
9. Knowles, J. P., Prankerd, T. A. J., Westall, R. G. *Lancet*, 1960, ii, 347.
10. Knowles, J. P., Prankerd, T. A. J. *Clin. Sci.* 1962 (in the press).
11. Smith, I., Birchenough, M. Chromatcgraphic and Electrophoretic Techniques. London, 1960.
12. Knowles, J. P., Prankerd, T. A. J. *Postgrad. med. J.* (in the press).
13. Knowles, J. P. *Gut* (in the press).

1. *Lancet*, Aug. 12, 1961, p. 327.
2. Sevitt, S., Gallagher, N. G. *ibid.* 1959, ii, 981.
3. Lyburn, E. F. St J. *J. Physiol.* 1956, **134**, 207.
4. Lyburn, E. F. St J. *J. clin. Path.* 1959, **12**, 711.

Two days before admission, pain and swelling of the left leg developed, accompanied by fever. In the night, chills, nausea, and vomiting occurred. Next day she felt tolerably well, but the same symptoms recurred the next night.

Bleeding duodenal ulcer and pulmonary embolism were suspected, but closer observation did not confirm the suspicion. Symptomatic treatment resulted in gradual improvement during the next few days, and the temperature returned to normal. During the first week in hospital the blood-pressure fluctuated between 140/90 and 175/100; a few readings were as high as 200/100 without being accompanied by changes in the general condition. These blood-pressure fluctuations were assumed to be related to the improvement in the general condition.

As the stools gave a strong blood reaction, and radiographs showed a deformity of the duodenal bulb, the gastric juice was examined. A few minutes after a subcutaneous injection of 0·5 mg. of histamine, general malaise and pallor developed, and the skin became cold and clammy. The blood-pressure rose to 300/160, but returned to 160 within an hour. The presence of a phæochromocytoma was then suspected, but even now no information of previous attacks could be elicited.

A 24-hour specimen of urine contained only 49 μg. of adrenaline and noradrenaline; but the diagnosis was confirmed by a second intravenous histamine test. Before the injection, the blood-pressure was 180/90; immediately after injection of 0·025 mg. of histamine it fell to 150/85 and then rose to 260/120. Within three minutes of an intravenous injection of 5 mg. of phentolamine the blood-pressure returned to the initial level. Nephrotomography showed a rounded soft-tissue shadow above the right renal pole.

At operation in April, 1961, a phæochromocytoma with a relatively thick capsule was removed; it measured 7 × 6 × 5 cm. and weighed 104 g. Histological examination revealed chromaffin cells, but no ganglion cells; no signs of malignancy were observed.

Extraction yielded 8·04 mg. of adrenaline and 1·27 mg. of noradrenaline per g. of tumour tissue—i.e., adrenaline represented 84% of the catechol amines.

Since the operation the patient has been perfectly well. Blood-pressure has been 160/80. Only after the operation did the patient recall that, during the past twenty years, she had had apparently unprovoked sudden attacks of tremor, pallor, sweating, and palpitation, lasting about fifteen minutes. These attacks came at long intervals, the last one about twelve months before the operation.

Medical Department B,
Frederiksberg Hospital,
Copenhagen.

IB STEINESS.

DIAGNOSIS OF ACUTE APPENDICITIS

SIR,—Since reading Mr. Bevan's dogmatic statement [1] that there is never an acute appendicitis present when cæcal gurgling can be elicited, I have been dismayed to remove an acutely inflamed appendix on three such occasions. I have also been dismayed to find the house-surgeon quoting this sign, and feeling that operative treatment was not justified since the patient could not have appendicitis. In each case the history and localised tenderness strongly suggested the diagnosis.

Unfortunately signs such as this, once promulgated, tend to be remembered, and when in doubt clung to tenaciously in the face of obvious symptoms and other signs that suggest the contrary. I therefore feel that before this sign becomes accepted and quoted in every textbook, a plea should be made for its complete rejection, and obliteration from the minds of all teachers, because it is obvious that far from assisting in diagnosis a further hazard has been added.

Coventry and Warwickshire Hospital,
Coventry.

PETER KNIGHT.

1. *Lancet*, 1961, i, 404.

SUBTOTAL PARATHYROIDECTOMY FOR RENAL HYPERPARATHYROIDISM

SIR,—We have recently had an experience which entirely confirms the claim of Stanbury and his colleagues [1 2] that subtotal parathyroidectomy may usefully reverse certain metabolic derangements in renal osteodystrophy.

A 35-year-old white woman had a history of nephrotic œdema in early childhood, followed by 20 years of recurrent urinary tract infection. For perhaps 5 years she had noted hard lumps under her skin in various places which slowly grew in size and number. In the autumn of 1959 her health began to deteriorate in a vague and insidious way—anorexia, fatigue, weight loss, bronzing of the skin, and diffuse skeletal pain being the prominent complaints.[3] When we first saw her in May, 1960, the chief abnormalities were (*a*) severe uræmia, (*b*) enormous areas of subcutaneous calcification over the right shoulder, lower abdomen, the inner aspects of each thigh, and the tip of the left index finger, and (*c*) radiological evidence of osteomalacia, osteitis fibrosa, and osteosclerosis. The blood-urea-nitrogen concentration was usually in excess of 100 mg. per 100 ml., hyperphosphatæmia was marked, and serum-alkaline-phosphatase concentration was moderately elevated, but the serum-calcium levels were essentially normal. The glomerular filtration-rate (endogenous creatinine clearance) was 7 ml. per min. The urine contained a trace of protein, numerous leucocytes, an occasional cast, and several strains of gram-negative bacilli. Since renal biopsy was unsuccessful and necropsy not ultimately performed, the diagnosis of primary renal disease was presumptive only.

Although we knew that most authorities advise against parathyroidectomy in uræmic patients it seemed to us that hyperparathyroidism evoked by primary renal disease might be even more serious than that occurring spontaneously in subjects with normal renal functions because minerals may be liberated from the skeleton faster than the kidneys can excrete them, a situation which favours soft-tissue calcification and continued dissolution of the skeleton. We were further encouraged by Stanbury's report, although the Albrightian disciples among us predicted acceleration of the uræmic state and increased phosphate retention. In July, 1960, therefore, three parathyroid glands with a total combined weight of about 10 g. were removed under local anæsthesia (a fourth gland could not be found). Mild tetany easily controlled by the ingestion of calcium gluconate was noticed for 3 or 4 days after operation, and from that time until her death from uræmia in September, 1961, she took 100,000–200,000 units of vitamin D daily. The surgical pathologist reported adenomatous hyperplasia of the parathyroids, the chief microscopic features being clear-cell hyperplasia interspersed with clusters of oxyphils.

Her immediate postoperative course was surprisingly smooth, but none of us were prepared for the dramatic speed with which the deposits of ectopic calcification disappeared. Within 4 months they had almost completely gone, and marked healing of osteitis fibrosa was noted by the radiologist. Skeletal pain subsided so rapidly that some of us were inclined to conclude that hyperparathormonæmia itself must be toxic. Healing of the osteomalacia under the influence of vitamin D was much slower but easily demonstrable in about 6 months. Contrary to prediction, the hyperphosphatæmia did not increase, although the glomerular filtration-rate slowly deteriorated until her sudden death at home from uræmia about 14 months after the operation. None of us of course expected the renal lesion to improve.

It may be claimed that parathyroidectomy did nothing to prolong this patient's life; but those responsible for her care were all persuaded that relief of skeletal pain and the improved sense of well-being were real dividends. The

1. Stanbury, S. W., Lamb, G. A., Nicholson, W. S. *Lancet*, 1960, i, 793.
2. Stanbury, S. W. *in* Recent Advances in Renal Disease; p. 131. London, 1961.
3. Moore, J. D., Brackney, E. L., Findley, T. *Trans. Amer. clin. climat. Ass.* (in the press).

disappearance of metastatic calcification and the healing of osteitis fibrosa, however, were easily documented. With this destructive process controlled, it then became possible to administer enough vitamin D to heal the osteomalacia without fear of hypercalcæmia.

Department of Medicine, Eugene Talmadge Memorial Hospital, Augusta, Georgia.

THOMAS FINDLEY
JERRY D. MOORE
EDWIN L. BRACKNEY.

METASTATIC TUMOURS OF LIVER

SIR,—Your interesting annotation of Nov. 11 surprised me because it did not mention peritoneoscopy as a method of detection. You quote Fenster and Klatskin's work on needle biopsy of the liver and you remark that the main objection to needle biopsy is its risk to life, a risk which you believe to be about equal to that of laparotomy. Peritoneoscopy, which consists of the introduction of an instrument resembling a cystoscope into the peritoneum after a pneumoperitoneum has been induced, is virtually without risk unless a biopsy is also attempted. A view of the anterior and anterosuperior surfaces of the liver is obtained which is equivalent in clarity to what can be seen in a perspex-mounted museum specimen. I would think that inspection in this way must be more reliable than blind needling of the liver for the detection of metastases and it is certainly infinitely safer. Fair-sized specimens for histological examination can also be obtained from selected places through a peritoneoscope though this does introduce some risk to life, small though it is in relation to your quoted figure, from Fisher and Faloon's paper, of 12% for needle biopsy in patients with liver metastases. Laparotomy is obviously the method of choice where a primary tumour—e.g., a carcinoma of the colon—is giving rise to its own symptoms because it can be resected. For excluding metastases from a symptomless primary tumour as a cause of hepatomegaly, peritoneoscopy seems to me to be the method of choice, and it can be done in jaundiced patients in whom a needle biopsy is an invitation to biliary peritonitis and death.

The Middlesex Hospital, London, W.1.

R. S. HANDLEY.

CONTAMINATION OF MILK BY RADIO-IODINE

SIR,—Miss Johnson and Dr. Pochin (Nov. 11) state that, to suppress the uptake by the thyroid gland of radio-iodine from milk, one alternative to the issue of dried milk would be the repeated administration of pharmacological doses of iodide.

A procedure to decrease the uptake would be to add much smaller quantities of iodide to milk. This could conveniently be done before the milk was bottled and as soon as an increase of radio-iodine in milk was threatened; it could be continued for weeks or even months.

Adding potassium iodide to milk would decrease the concentration of radio-iodine as a percentage of total iodine (i.e., its relative concentration) in the diet and hence in the bodies and ultimately the thyroids of those consuming milk. This decrease would be greatest in those most likely to be in danger, those whose only source of iodine is milk. However, it is not the relative concentration but the amount of radio-iodine in the thyroid that is relevant to the probability of radiation damage. The present proposal would be effective only if increasing the intake of dietary iodine led to a greater total excretion of iodine and only a negligible increase in that held in the thyroid gland.

The amount of iodide required would be small. According to Spector,[1] the average concentration of iodine in cows' milk is 21 μg. per 100 ml.—i.e., 119 μg. per pint. An equivalent concentration of iodine would be obtained from potassium iodide at 156 μg. per pint. Thus, adding 156 μg. of potassium iodide per pint of milk as a routine measure should, in the long run, halve the relative concentration of radio-iodine in the bodies of those getting all their iodine from milk. If the threatened level of radioactivity warranted it, larger amounts of iodine might be added to milk with little possibility of toxic effects to the consumer.

An advantage of this proposal would be that the amount of extra iodine taken would be proportional to the radio-iodine consumed.

Virginia Water, Surrey.

B. T. WARNER.

SIR,—Recent correspondence in *The Lancet* suggests that persons at risk of absorbing radioactive iodine could be protected by the administration of stable iodide. We have considered the same principle in relation to the protection of persons who might be at risk in the unlikely event of an accidental emission of radioactive material from a nuclear power station. A paper dealing with this subject quantitatively and making recommendations is at present in the press (*Health Physics*, New York). The case in which there is continued ingestion of radioactive iodine is not covered by the assessment we have given but in our view the short-term treatment is shown to be effective and safe.

Central Electricity Generating Board, London, S.E.1.

C. A. ADAMS
J. A. BONNELL.

THE INDUSTRY IT DESERVES?

SIR,—It is a source of continual surprise to me that so many people seem to believe that the quality of drugs is constant no matter who the manufacturer, and that in this respect drugs are quite unlike other manufactured items. I feel that in doing this they confuse standards of purity as, for example, those set out in the *British Pharmacopœia*, with physiological response.

Therapeutic response is often modified by pharmaceutical formulation, and in his letter of Nov. 4 Dr. Laurence is on potentially dangerous ground, therefore, when he advocates the use of generic names in place of trade names. I must admit to seeing little of practical value in his suggestion of adding the manufacturer's name to Drug X. As most pharmacists can tell him, prescribers rarely do this, although many opportunities exist—e.g., aspirin, phenobarbitone.

The rate of absorption of cortisone acetate into the general circulation is related to crystal size. The drug exists in several crystal forms, many of which will transform to different crystalline states when presented in a parenteral product. Resultant caking could bring about inadequate dosage control. I would respectfully invite Dr. Laurence to comment on this fact from his existing knowledge of the large number of brands of cortisone injection at present on the market. Incidentally he will find no reference to this "standard" in the 1958 *B.P.* monograph on cortisone acetate.

One could quote many similar examples of therapeutic efficacy varying with pharmaceutical formulation, and I would direct any serious inquirer to the paper by Levy and Nelson.[1]

Oxted, Surrey.

BRIAN E. HÉBERT.

SIR,—I do not think that my letter really gives Mr. Hébert any good grounds for assuming, as he appears to, that one who holds views unacceptable to his own does so as a result of ignorance.

The fact that preparations differ in reliability does not inevitably lead to the conclusion that the present chaos of drug names is best left alone.

1. Spector, W. S. Handbook of Biological Data; p. 50. Philadelphia, 1956.

1. *J. Amer. med. Ass.* 1961, **177**, 689.

His question on cortisone preparations is easily answered. No preparation of cortisone should be marketed unless there have been satisfactory clinical trials which have proved its reliability. No doubt a regulation of this sort would lead to fewer preparations being introduced and, if so, so much the better. It is the responsibility of manufacturers *not* to market anything until they have had adequate clinical trials. It is not the responsibility of the doctors to pick and choose between advertised preparations to discover which claims are false.

Mr. Hébert's approach is one that I have come to consider characteristic of drug firms who do not admit the true responsibilities of the industry, although I have no knowledge of Mr. Hébert's affiliations.

On the minor point that doctors don't use the opportunities at present available for prescribing by generic name plus manufacturer's name. This does not, of course, give any indication of what they would do if a complete revision of marketing technique took place, coupled, as no doubt it would be, with authoritative guidance in the *Prescriber's Journal*. One reason for doctors not prescribing as suggested is, of course, the fact that they almost never have the necessary facts on which to make a decision on whose cortisone, aspirin, or phenobarbitone is reliable and whose is not. Such information is seldom easily acquired in a routine clinical practice.

The professor of medicine of the University of Illinois has put the subject very clearly. "If drugs are not up to standard they should not be on the market at all. The prevention of the use of substandard drugs should not have to depend upon the vigor of the advertising campaigns of the companies whose drugs are up to standard." In this recent article [1] and in another [2] by the director of revision of the *U.S. Pharmacopœia* the whole problem is discussed in detail, and constructive suggestions for a solution made. It only remains, I repeat, for the drug firms to take the matter seriously and to begin discussions with the medical profession with the real intention of doing something about it and not merely of defending the status quo.

Dr. Schmeidler (Nov. 11) refers to the delay in giving a drug a generic name as a reason for retaining trade names. It is hard to believe that this difficulty could not easily be overcome. A name for a drug has to be chosen, let it be the generic name. Or, failing that, at least let us not have trade names invented by anyone other than the initial discoverer of the drug.

University College Hospital Medical School, London, W.C.1. D. R. LAURENCE.

WERNER'S SYNDROME

SIR,—Many forms of constitutional disorder are likely to be investigated for evidence of chromosome abnormalities. One which has a potentially high research importance at present is Werner's syndrome (precocious senility of the adult, adult progeria). This condition has been blamed on every endocrine gland in turn, but it appears likely that it will turn out to be a pleiotropic tissue defect,[3] possibly the lack of an enzyme system. Since any new light on this condition might provide a clue to one or more of the timekeeping systems of normal senescence, may I urge any clinician who has access to a case to get in touch with the cytologists and let them look at its chromosomes?

Department of Zoology, University College London, London, W.C.2. ALEX COMFORT.

1. Dowling, H. F. *New Engl. J. Med.* 1961, **264**, 75.
2. Miller, L. C. *J. Amer. med. Ass.* 1961, **177**, 27.
3. Boyd, M. W. J., Grant, A. P. *Brit. med. J.* 1959, ii, 920.

NIGHT-CALL SERVICES

SIR,—"Postgraduate" (Nov. 11) has made a plea for the N.H.S. to take over the private night-call services. While I would rather not comment about this remedy, I should like to confirm the poor rates of pay and to warn intending recruits of the tricks used by the unscrupulous organisers of some of these services to make the low rates of pay even lower.

When I joined one of these night-call services for occasional evening work, I was told that the rate of pay was 6*s*. 8*d*. per call with a guaranteed minimum of £1 per session. A bonus of 1 guinea was offered for 10 or more calls in one session. When the first cheque arrived, it was found to be less than the expected amount. Inquiries revealed that a deduction for "car insurance" was made from each session. Later, the £1 guaranteed minimum per session was abolished. After about a year and with no prior warning, the organisers suddenly refused to pay a bonus any more. I had rather foolishly trusted the organisers and had no form of written contract. Thus I lost several guineas due to me.

Another source of underpayment is the omission of the names of patients you have visited from the organisation's records, and this led to frequent disputes.

May I advise anybody intending to work for one of these organisations to get some form of written contract signed before they start work and to keep a record of all the work that they do.

ANOTHER POSTGRADUATE.

Public Health

Iodine 131 in Milk

THE latest figures from the Agricultural Research Council Radiobiogical Laboratory are:

Average Levels of Iodine 131 in Milk Throughout the United Kingdom

Week commencing	*μμC iodine 131 per litre*
Sept. 16	85
Sept. 24	109
Oct. 1	138
Oct. 8	150
Oct. 15	114
Oct. 22	158
Oct. 29	127
Mean for 7 weeks (Sept. 16–Nov. 4)	126

The mean results for samples collected on four dates (Oct. 2, 16, 23, and 30) from depots which handle more than 40% of the country's total milk production were:

Zone	*μμC iodine 131 per litre*
1. Northern England	114
2. North West England	105
3. East and East Midland	83
4. West Midland	111
5. Wales	181
6. South and South East England	106
7. Mid-Western England	108
8. Far Western England	153
9. Scotland	160
10. Northern Ireland	167

The Medical Research Council has stated that the "acceptable radiation dose" would not be exceeded for infants under one year of age, the most susceptible group of the population, unless the average concentration of iodine 131 in milk rose above 130 μμC per litre over a period of one year, or higher concentrations were maintained for correspondingly shorter times. In making its recommendation the Medical Research Council made allowance for the likely extent of variation in the concentration of radioactive iodine in local milk supplies.

Even in the regions where the highest levels have been observed, an annual average of 130 μμC per litre will not be reached unless the present levels are maintained for a further six or seven months or are substantially increased. The total quantity of iodine 131 which has so far entered milk in these regions is less than a fifth of the total which would give rise to the annual level specified by the Medical Research Council. Measurements are being continued.

Parliament

Education Bill

ON Nov. 13, in moving the second reading of this Bill, Sir DAVID ECCLES, the Minister of Education, said that the Bill would provide statutory authority for the reform of the system of grants to students announced after the report of the Anderson Committee.[1] The fundamental principles of the new system—automatic awards and uniformity of treatment—would be generally acceptable. There would be some disappointment that the means test, though relaxed, was not abolished. It was a difficult issue, but he was sure that at this stage the cost of abolition ought to persuade us to retain the test, though in a relaxed form. Awards to students now cost £35 million a year. The changes to be made under the Bill would add another £10 million: to abolish the means test would take yet another £10 million. He was bound to say that he thought the money could be spent to better advantage in other parts of the service. As a result of the proposed changes 40% of the students would receive the maximum grant, as against 25% on the old criterion. About 10,000 families would be relieved of contributions and those in the middle range of income would pay substantially less.

QUESTION TIME

Platt Report

Lord BALNIEL asked the Minister of Health whether he was yet able to make a statement on the report of the Working Party on Medical Staffing Structure in the Hospital Service. Mr. ENOCH POWELL replied: The Government, with the agreement of the medical profession, accept the main principles of the report. The profession has reserved its position on the precise type of intermediate grade that may be required, its extent, title, and salary. These matters will be further considered following the review of medical staffing, in accordance with the principles of the report, which will now be undertaken.

Mr. L. A. PAVITT asked the Minister what progress had been made in establishing the review machinery to advise on hospital medical staffing.—Mr. POWELL replied: The Secretary of State for Scotland and I will shortly be issuing circulars to boards for the purpose of establishing the review machinery and implementing the Working Party's other recommendations. Mr. PAVITT: Whilst thanking the Minister for at last getting on with the job after twelve months' delay since the publication of the Platt report, may I ask him whether he is aware that there is a considerable amount of anxiety among time-expired registrars and S.H.M.O.s about this, and will he do all he can to put them out of their present anxiety? Mr. POWELL: I am anxious to get on with this as fast as possible, but I have only just received the profession's agreement to the report.

Mr. ROBINSON: Would the Minister say another word about the nature of the review machinery? Is it to be entirely within the regional boards themselves, or is it to be done by a national body imposed from outside on the regional boards? In short, are the boards to do their own reviewing, or are they to have it done for them? Mr. POWELL: There is a regional-board stage, although there will be a national review of the results of the regional boards' review. I will give particulars as soon as the machinery is settled, which I hope it shortly will be, with the profession. Lord BALNIEL: In order to speed up the machinery, are boards of governors to be asked to submit their reports sectionally according to individual occupations, or are they to await a general review before submitting their reports to the regional boards? Mr. POWELL: It will be possible to deal with part of the field separately if desired.

Regional Appeals Committee

Mr. PAVITT asked the Minister to what extent, under his regulations, a decision of a regional appeals committee can be reversed by a recommendation subsequently submitted by staff inspectors to a group hospital committee.—Miss EDITH PITT replied: Not at all. Mr. PAVITT: Is the hon. Lady aware that some staff inspectors have recommended the downgrading of posts after upgrading has been passed by the regional appeals committee? Is this not a grave interference with the ordinary arbitration machinery, and does it not amount to an undermining of the competence of staffs in the Ministry's machinery? Miss PITT: I think that the hon. Gentleman is not correct in saying that downgrading was recommended. The inspectors may have recommended, in a particular case, that there should be no change while the present holder has that post but that the question of grading should be reconsidered when a new appointment has to be made. Mr. PAVITT: Is that not tantamount to the same thing—that if a recommendation has been passed by the regional appeals committee and a staff inspector considers that at the end of the incumbency of that occupant this post should be downgraded, is not this overriding the opinion of the regional appeals committee? Miss PITT: No, Sir. An appeal relates to that man and the work he is doing. While he occupies that post he enjoys what grading has been agreed by the appeals committee.

Pay of Professional Staff in the N.H.S.

Mr. ROBINSON asked the Minister if he would set up a committee to consider the remuneration of qualified professional staff, other than doctors and dentists, in the National Health Service, and, having regard to the staffing needs of the service, to recommend what relationship the salary scales of the various professions should bear to each other and to the remuneration of doctors.—Mr. POWELL replied: No, Sir. Mr. ROBINSON: Why not? Is the Minister not aware that these groups include such people as physiotherapists and radiographers who are in such short supply in the service and are bringing it grinding to a halt, to quote *The Times*. Mr. POWELL: To do this would be inconsistent with the working of the normal wage negotiation machinery. It would be quite impossible for that to be worked if there were to be special inquiries, save in the most exceptional circumstances.

Home Confinement Grant

Mr. J. W. SNOW asked the Minister of Pensions and National Insurance whether he was satisfied with present arrangements whereby part or whole of a home confinement grant may be stopped if, in the opinion of the medical advisers concerned, it becomes desirable during the ten days that part of that period should be spent in hospital although the confinement was originally registered as domiciliary.—Mrs. MARGARET THATCHER replied: The home confinement grant is a single payment of £6 for confinements at home. The Minister is satisfied that we have gone as far as we reasonably can in also treating certain confinements in National Health Service hospitals as though they had taken place at home. These are cases where the mother has made arrangements to have her baby at home but has had to be admitted to hospital as an emergency case before the baby was born. Admission to hospital after the birth does not deprive the mother of this grant. Mr. SNOW: If I understand the hon. Lady's answer correctly, she stands on the argument that cases will arise where the mother, although she was intending to have her baby at home, has to go to hospital for a few days, and she will not be given any form of grant. Does not this create hardship in the sense that the mother and the family will have involved themselves in expenditure in anticipation of the baby being delivered at home? Mrs. THATCHER: The purpose of the grant is to induce people to make arrangements to have the confinement at home and for the baby to be born at home. The Minister knows that there are cases where women have to be admitted to hospital. Special arrangements are made for them to receive the home confinement grant, notwithstanding the fact that the baby is born in hospital, because they have incurred expenditure; but a line has to be drawn somewhere and, broadly speaking, it is drawn at a maximum of five days.

1. See *Lancet*, 1961, i, 406.

Obituary

ERIC WORDLEY

M.C., M.D. Cantab., F.R.C.P.

FOR thirty years, from his laboratory at the South Devon and East Cornwall Hospital in Plymouth, Dr. Wordley ran the pathological services of the West country, and medicine there owes much to his competence and organising ability.

He was born in London in 1887, the son of T. Wordley, and was educated at Oldenham School and the University of Cambridge. He qualified in 1913 from St. Thomas's Hospital and held several house-appointments there before he joined the R.A.M.C. at the beginning of the 1914–18 war. He was posted as regimental M.O. to a cavalry regiment, and he took part in the retreat from Mons. He continued to serve with distinction, winning the Military Cross. At the end of the war he returned to St. Thomas's and took up pathology, becoming assistant bacteriologist to the hospital.

In 1922 Dr. Bertram Soltau, who was planning an extension of the South Devon and East Cornwall Hospital and its services, suggested that Wordley should move to Plymouth to start and administer the pathological laboratory there.

It is a measure of Wordley's success that, whereas in his first year at Plymouth there were 700 pathological examinations, in 1952, when he retired, there were 55,000. Yet, during these thirty years there was no extension of the accommodation provided, which became terribly cramped for his one qualified assistant and his technicians. The work could never have been completed had he not been something of a martinet with a shrewd brain, a clear appreciation of essentials, and a streak of ruthlessness in eliminating everything that was superfluous. Although he drove them hard, his staff were devoted to him. It was a point of honour that all requests were dealt with on the day they were received, and, if the technique allowed, reports were delivered to the wards or in the post before the laboratory closed in the evening.

Wordley was an able clinician as well as a competent pathologist, and during the difficult years of the bombing of Plymouth he supervised a full share of medical beds while his colleagues were absent on war service. He was elected F.R.C.P. in 1936. He retired because of ill health in 1952, and he died at his home at St. Mawes on Nov. 6.

W. A. L. writes:

"Not all those who knew him broke through Wordley's somewhat formidable veneer of brusqueness and intolerance to discover the warmth of his friendship, his wide culture, and his varied enthusiasms and interests. He was a keen golfer until stiffened by rheumatism. He delighted in his rough shoot and latterly in sailing small boats; and he was a charming host and the life and soul of the party at the annual Doctors *v.* Lawyers' golf match. But should a new and unwary resident submit an unnecessary request which he could not justify with good reason, a painful but most educational interview was liable to follow. Senior members of the staff were by no means immune, for Wordley was no respecter of persons. But anyone with a genuine difficulty or problem would receive from him unstinted help and support, backed up by wide reading and experience, complete integrity, and wise judgment which always put first things first."

Dr. Wordley leaves a widow, a son and two daughters.

Notes and News

AN ACHIEVEMENT

THE arms shown below are those lately granted to the College of General Practitioners.

The black and white shield, a mirror image of the arms of St. Bartholomew's Hospital, London, suggests that the family doctor is on duty night and day, and that he shares whatever grief or joy he may find in the home, whose symbol is the chevron, the house-roof.

Against this background are set an opium poppy and a gentian, examples of the simple remedies he has used for centuries, and still uses, in his daily practice. The lighted lamp is taken direct from the crest of the Royal College of Nursing, and will perpetually remind him how much he owes to the sister profession.

Of the supporters, the unicorn comes from the arms of the Society of Apothecaries of London: he is not, of course, the royal unicorn, but is exactly as granted to the Apothecaries in 1617. The lynx first appears as an augmentation, granted in 1569, to the Barber Surgeons Company of London, his coloured spots being the eyes all over him, which give him his all-seeing character—"and what could be more appropriate for a general practitioner than that?"

The crest is the owl, for wisdom, holding the chairman's gavel which was presented to the college by the Greek Ambassador at the first annual meeting in 1953. The motto, *cum scientia caritas*, might be translated, "with skill, tender loving care".

In brief, these arms "indicate the general practitioner's humble origin and his ancient lineage, stress his close cooperation with nurses and with hospitals, and stimulate him to explore the bright prospect of the future."

SCOTTISH HOSPITAL ENDOWMENTS RESEARCH TRUST

THE policy of the Trust has been revised this year and it has been decided that with its present income it will in future only very occasionally make large capital grants, and then usually with other bodies as part of a combined operation. Grants to short-term projects will also be limited, for it is felt that many of these could appropriately be sponsored by hospital boards of management, which have power to use their own endowment funds for research. There is however a growing need in Scotland for support of research by individual workers or by teams who have received a basic training in research but have not yet reached "the top level in their profession". The Trust has accordingly agreed to give research fellowships for 2–5 years (with provision for technical assistance and equipment) and to institute research groups where more appropriate. It is hoped in this way to give scope to experienced investigators and opportunities for further training to promising juniors. The Trust believes that the policy "offers a valuable means of keeping within Scotland a number of the medical graduates trained in Scotland who may be tempted to seek research facilities elsewhere".

During 1959–60 the Trust authorised grants of £118,000—over £25,000 more than in the preceding year. It received

£30,000 in donations and legacies and the income from investments was £112,000.

The address of the Trust is 12, Hope Street, Edinburgh. Copies of the report (1*s.* 9*d.*) may be had from H.M. Stationery Office.

NEW AUSTRALIAN JOURNAL

MEDICAL practice in Australia is centred on a highly competent and energetic general-practitioner and consultant service, financed by a fusion of private insurance and Federal subsidy. The teaching hospitals are in general staffed on an honorary system: the private practice from which honoraries gain their livelihood is often undertaken in rooms and private hospitals far distant from the teaching centre. But in the past few years the teaching hospitals have been building up "geographically whole-time" staff, especially in pathology, radiology, and anæsthetics. The registrar complement of the teaching hospitals has been greatly increased, and all the States have now fully established university units.

In an effort to stimulate investigation and cope with its publication, a new periodical, *South Australian Clinics*, has been initiated. It will be published three times a year by each of the three major South Australian teaching hospitals in turn. The first number, which comes from the Queen Elizabeth Hospital, Adelaide, is devoted largely to historical notes on the development and purpose of this splendidly equipped new general hospital. Further issues of the *Clinics* will be devoted essentially to scientific papers.

POST FAIRLY EARLY

THE realisation that the last Christmas sea mail to several distant parts of the world has already left is probably weighing on the conscience of many of our readers. Two well-known proverbs will comfort them: If you have missed the boat you can still catch the plane; and there is nothing like a good cause to assuage a feeling of guilt. We would, therefore, recommend them to write without delay to one, other, or all of the following medical or near-medical vendors of Christmas cards:

Grenfell Association (Hope House, Great Peter Street, London, S.W.1.) 3*d.* to 9*d.* per card; National Association for Mental Health (39, Queen Anne Street, S.W.1) 4*s.* 6*d.* to 9*s.* 6*d.* per dozen and a packet of 18 assorted cards for 10*s.*; National Deaf Children's Society (31, Gloucester Place, W.1.) 6*s.* 6*d.* and 9*s.* 6*d.* a dozen; National Marriage Guidance Council (58, Queen Anne Street, W.1.) 3*s.* to 12*s.* a dozen; United Nations Children's Fund (14, Stratford Place, W.1) boxes of 10 cards for 7*s.* 6*d.*

University of Cambridge

On Nov. 4 the degree of M.D. was conferred on E. A. Cooper and of M.CHIR on P. H. Lord (both by proxy).

University of London

The title of reader in bacteriology has been conferred on Dr. C. H. Lack in respect of his post at the Institute of Orthopædics, of reader in physiology on Dr. M Schachter in respect of his post at University College, and of reader in virology on Dr. C. E. Gordon Smith in respect of his post at the London School of Hygiene and Tropical Medicine.

University of Sheffield

A course in dermatology for general practitioners will be held from April 9 to 13 at Sheffield Royal Infirmary. Further details will be found in our advertisement columns.

University of Wales

At a recent examination for the D.T.C.D. Jamal Hedayati and Sarajit Kumar Sen were successful.

Royal Faculty of Physicians and Surgeons of Glasgow

At a meeting of the faculty on Nov. 6, the following officers were elected:

President, Dr. J. H. Wright; visitor, Sir Charles Illingworth; hon. secretary, Dr. Gavin Shaw; hon. treasurer, Mr. R. B. Wright; hon. librarian, Dr. A. L. Goodall; representative on the General Medical Council, Prof. D. F. Cappell; councillors, Dr. W. Ferguson Anderson, Prof. Roland Barnes, Mr. Thomas Gibson, Dr. A. D. Telford Govan, Mr. A. B. Kerr, Prof. Thomas Symington, Dr. T. J. Thomson, Prof. Thomas C. White.

Royal College of Surgeons of England

At a meeting of the council on Nov. 9, with Sir Arthur Porritt, the president, in the chair, licences to practise were conferred on those named in the report of the comitia of the Royal College of Physicians of London in our issue of Nov. 4 (p. 1049).

Royal College of Physicians of Edinburgh

At a meeting of the college on Nov. 7, with Dr. J. D. S. Cameron, the president, in the chair, the following were elected to the fellowship:

Mohammad Akram, Maurice Nellen, Kenneth Hazell, P. L. E. Wood, Thomas Black, Abul Khair Shamsuddin Ahmed, Sujoy Bushan Roy, G. W. Senter, J. R. Fountain, E. M. Donaldson, T. W. G. Kinnear, T. G. Wilson, E. N. Moyes, R. E. Beamish, F. W. A. Turnbull, W. H. Jopling, W. R. M. Alexander, J. McC. Murdoch, Arthur Saravanamuthu Thambiah, R. E. Church, Roeinton Burjor Khambatta, J. M. Sutherland, Jaswant Singh Sodhy, B. R. Hillis, J. B. Gibson, Chukuedu Nwokolo, G. R. Tudhope, Sohan Singh Manchanda, Alexander Slessor, A. P. Trimble, William Blackwood, J. B. Stanton, J. A. Simpson, Theophilus Oladipo Olufemi Ogunlesi, T. N. MacGregor, Wilfred Sircus, J. D. Sutherland, M. B. Matthews.

The following were elected to the membership:

F. S. Fiddes, R. H. A. Swain, F. M. Parsons, T. D. V. Lawrie, J. H. G. Brodribb, Leslie Koadlow, R. J. Moylan-Jones, Selim Ibrahim Osman, Mostafa Kadry El-Dars, Jagmohan Grover, Joachim Schneeweiss, J. C. Davies, Isobel H. Grant, Henry Chukelu Curtis Nwankwo, Bhola Mahton, R. L. Holman, Kim Siong Lim, A. F. Macdonald, A. G. Ironside, Manohar Singh Grewal, K. S. Holmes, Subhash Chandra Chakrabortti, K. B. Harveyson, Zuhair Abdulla Kassir, Krishan Chandra Sharma, A. G. Resnekov, Rameshchandra Hiralal Shah, W. J. Nicholson, Savarimuttu Rajasekaram Christopher, D. S. Nurse, Satyajit Chaudhuri, Kolita Edmund de Silva Karunaratne, Vireshwar Prasad Hajela, Kwan-How Chin, Alay Zamin Rizavi, P. J. Toghill, M. J. O'Donnell, A. G. M. Campbell, J. E. Williams, S. M. Rosen, I. S. Berg, A. H. Crisp, J. D. M. Richards, Clyde Ying-Chau Wu, N. R. M. Buist, I. C. Crawford, A. A. M. Gibson, J. T. Ireland, Rafique Uddin Ahmed, Sudhansu Chokroverty, P. C. C. Pitt, Prem Narayan Jha, Bhupatrai Chhotalal Mehta, Riyazuddin, Myra Chadwick, A. J. Levi, N. T. A. Byam, Roy Ranjeet Ghose, Piroj Vasanji Meswani, Beng Keng Chew, Iris M. Duke.

Royal College of Physicians of Ireland

At a meeting on Nov. 3, with Dr. R. E. Steen, the president, in the chair, the following were admitted to the membership:

S. P. Hefferman, E. S. Lamont, M. J. Noronha, D. G. Weir.

Sheffield Regional Hospital Board

Dr. S. Shone has been appointed senior administrative medical officer to the board, in succession to Dr. W. A. Ramsay, who is retiring. Dr. Shone has been deputy senior administrative medical officer to the board since 1949.

He qualified from Guy's Hospital in 1929, taking the M.R.C.P. in 1931 and the M.D. in 1932. After holding house-appointments at Guy's and spending some years in general practice, he joined the Indian Medical Service in 1937. He serviced in Egypt, Sudan, Italy, and India, and attained the rank of lieut.-col. He was appointed O.B.E. in recognition of his work. In 1945 the Madras Government invited him to become professor of medicine at the Andhra Medical College, North Madras, with superintendency of the King George Hospital at Vizagapatam. Two years later he was appointed chief physician to the Kailan Mining Administration, North China. This appointment ended because of the changed political situation, and he then took up his present appointment with the Sheffield R.H.B.

Rockefeller Foundation

During the third quarter of 1961 the Foundation distributed $1,816,815. Grants in the medical and natural sciences amounted to $644,710.

The Association of American Medical Colleges, Evanston, Illinois, which is organising a division of international medical education, is to receive a grant of $50,000. The division will recruit American medical faculty members for overseas assignments, and place foreign medical educators on study leave in institutions in the United States. Part of the University of Khartoum's grant of $71,000 will go to the faculty of medicine, which under its dean, Dr. H. Butler, has recruited a staff of British doctors who are training young Sudanese scientists to take over direction of the departments of the medical school. The Medical Research Council is expanding research on the structure of proteins at its Unit for Research in Molecular Biology at Cambridge with the help of a grant of about $21,000. Under the directorship of Dr. Max Perutz, the unit is furthering research on myoglobin and hæmoglobin and has made long-range studies of the structure of other globular proteins such as those found in viruses.

Royal Society

The Copley medal has been awarded to Sir Hans Krebs for his contributions to biochemistry, in particular his work on the ornithine, tricarboxylic acid, and glyoxylate cycles.

College of General Practitioners

On Saturday, Nov. 25, at 11.30 A.M., at B.M.A. House, Tavistock Square, London, W.C.1, Dr. Annis Gillie will give the eighth James Mackenzie lecture. The title of her address is to be James Mackenzie and General Practice Today.

Disorders of Carbohydrate Metabolism

The Royal College of Physicians have chosen this subject as the theme of their next conference, which will be held on March 30 and 31. It is primarily arranged for fellows and members who are consultants in medicine or pathology.

The speakers will include Prof. Frank Dickens, Dr. P. J. Randle, Prof. F. G. Young, Dr. K. W. Taylor, Dr. John Vallance-Owen, Prof. W. J. H. Butterfield, Dr. D. A. Pyke, Dr. W. G. Oakley, Dr. J. M. Stowers, Dr. J. D. N. Nabarro, Dr. J. M. Malins, Dr. J. S. Robson, Dr. Harry Keen, Prof. Norman Ashton, Prof. Russell Fraser, Dr. Christopher Hardwick, and Dr. Vincent Marks. Numbers have to be limited, and application should be made to the Registrar at the College, Pall Mall East, S.W.1, not later than Jan. 31. The entrance fee is five guineas, which should *not* be sent with the application.

Department of Technical Cooperation

Dr. J. M. Liston is to succeed Sir John Buchanan as chief medical officer when Sir John retires in March. Dr. Liston qualified from the University of Glasgow in 1932 and has served as director of medical services in Tanganyika and Sarawak.

Dr. P. W. Dill-Russell, at present director of medical services in Fiji, will succeed Dr. Liston as deputy chief medical officer.

A meeting of the Society for Endocrinology is to be held on Saturday, Nov. 25, at 11 A.M., in the Medical School, Edgbaston, Birmingham, 15, when short papers will be read.

A meeting of the London group of the Anglo-American Medical Society is to be held on Wednesday, Nov. 22, at 8.30 P.M., at the English Speaking Union, 37, Charles Street, London, W.C.1, when Dr. Alistair French and Major William Rule will speak on medical malpractice in England and the United States.

On Thursday, Nov. 23, at 5.30 P.M., at the Fountain Hospital, Tooting Grove, London, S.W.17, Dr. Valerie Cowie will speak on maternal constitution and mongolism, and Dr. Lawrence Goldie on dullness and E.E.G. changes.

Appointments

DALLY, P. J., M.B. Lond., M.R.C.P., D.P.M.; consultant, psychiatric department, Westminster Hospital, London.
DODD, K. W., D.S.C., M.R.C.S., F.F.A.R.C.S., D.A.: consultant anæsthetist, Edinburgh Southern hospital group.
FIFE, J. G., M.B. Lond.: senior M.O. for mental health, Essex.
GOLDSMITH, H. J., M.D. Lond., M.R.C.P.: consultant physician, Sefton General Hospital, Liverpool.
HOLLIER, PAULINE, M.B.: assistant M.O.H. and school M.O., West Bromwich.
MUIRHEAD, JESSIE M. B., M.B. St. And., M.R.C.O.G.: consultant in obstetrics and gynæcology, Hull area.
PEARCE, K. M., M.B. Manc., D.C.H., D.M.S.A.: M.O. to conduct inquiry on behalf of the Nuffield Provincial Hospitals Trust into hospital waiting-lists in Northumberland and Newcastle upon Tyne.
TEVENDALE, JAMES, M.B. Glasg., F.R.C.S.E.: consultant E.N.T. surgeon based at Victoria Hospital, Kirkcaldy.

The Hospital for Sick Children, Great Ormond Street, London:

HARRIS, DOROTHY E., M.B. Lond., F.F.A.R.C.S., D.A.: anæsthetic registrar.
KEITHLEY, J. E., M.B. Lond.: house-surgeon (orthopædic and plastic).
LEWIS, N. A., M.B. Bombay: house-physician.
NORMAN, PATRICIA M., M.B. Dubl.: registrar, department of microbiology.
ROBERTS, G. E., M.B. Wales, D.P.M.: house-physician.
VAZ, OLIVE K., M.B. Calcutta: assistant M.O., Tadworth.

South Western Regional Hospital Board:

DIXON, M. F., M.B. Lond., M.R.C.P., D.P.M.: consultant psychiatrist, Roundway Hospital, Devizes.
LAKE, R. H. N., M.B. Lond., F.F.A.R.C.S., D.A.: consultant anæsthetist, Plymouth clinical area.
MULCAHY, FRANCIS, M.B., N.U.I., F.F.R., D.M.R.D.: consultant radiologist with duties mainly at Gloucestershire Royal Hospital.
SAXTON, H. M., M.B. Lond., M.R.C.P., F.F.R., D.M.R.D.: consultant radiologist with duties mainly at Cheltenham General Hospital.

Mr. R. Blyth, M.P.S., has been appointed editor of the *Pharmaceutical Journal*.

The presidents' annual dinner of the Royal Medical Society is to be held on Thursday, Nov. 23, at 7.30 P.M., at the Royal College of Surgeons of Edinburgh, Nicholson Street, Edinburgh, 8, when Sir Derrick Dunlop, the guest of honour, will launch an appeal for funds to enable the society to build new premises.

The address of the Nursing Recruitment Service is now 6, Cavendish Square, London, W.1. The telephone number, Langham 4362, is unchanged.

Diary of the Week

NOV. 19 TO 25

Monday, 20th

POSTGRADUATE MEDICAL SCHOOL OF LONDON, Ducane Road, W.12
4 P.M. Dr. Brian Ackner: Psychopathic Personality.
CIBA FOUNDATION LECTURE
5 P.M. (66, Portland Place, W.1.) Prof. E. Katchalski (Rehovoth): Synthetic Macromolecules as Protein Models.
HUNTERIAN SOCIETY
8.30 P.M. (Apothecaries' Hall, Black Friars Lane, E.C.4.) Sir Frederick Pritchard, Dr. M. G. C. Ashby (for); Sir Basil Henriques, Dr. David Stafford-Clark (against): That Corporal Punishment is an Effective Deterrent against Crimes of Violence.

Tuesday, 21st

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn Fields, W.C.2
5 P.M. Dr. R. C. B. Pugh: Histopathology of the Prostate. (Erasmus Wilson demonstration.)
UNIVERSITY OF LONDON
5.30 P.M. (London School of Hygiene and Tropical Medicine, Keppel Street, W.C.1.) Prof. A. V. Neale: Epidemiological Trends and Achievements, with Particular Reference to Tuberculosis. (Third of five Heath Clark lectures.)
BRITISH POSTGRADUATE MEDICAL FEDERATION
5.30 P.M. (London School of Hygiene and Tropical Medicine.) Dr. A. R. Harrison: Primary Hyperparathyroidism.
ST. MARY'S HOSPITAL MEDICAL SCHOOL, W.2
5 P.M. Prof. J. S. Scott: Intersex.
WEST END HOSPITAL FOR NEUROLOGY AND NEUROSURGERY, 91, Dean Street, W.1
5.30 P.M. Mr. K. I. Nissen: Orthopædic Aspects of Pain in the Upper Limb.
MANCHESTER MEDICAL SOCIETY
4.30 P.M. (Medical School, University of Manchester.) Mr. Arthur Rocyn-Jones: Early Healers of Skeletal Disorders.

Wednesday, 22nd

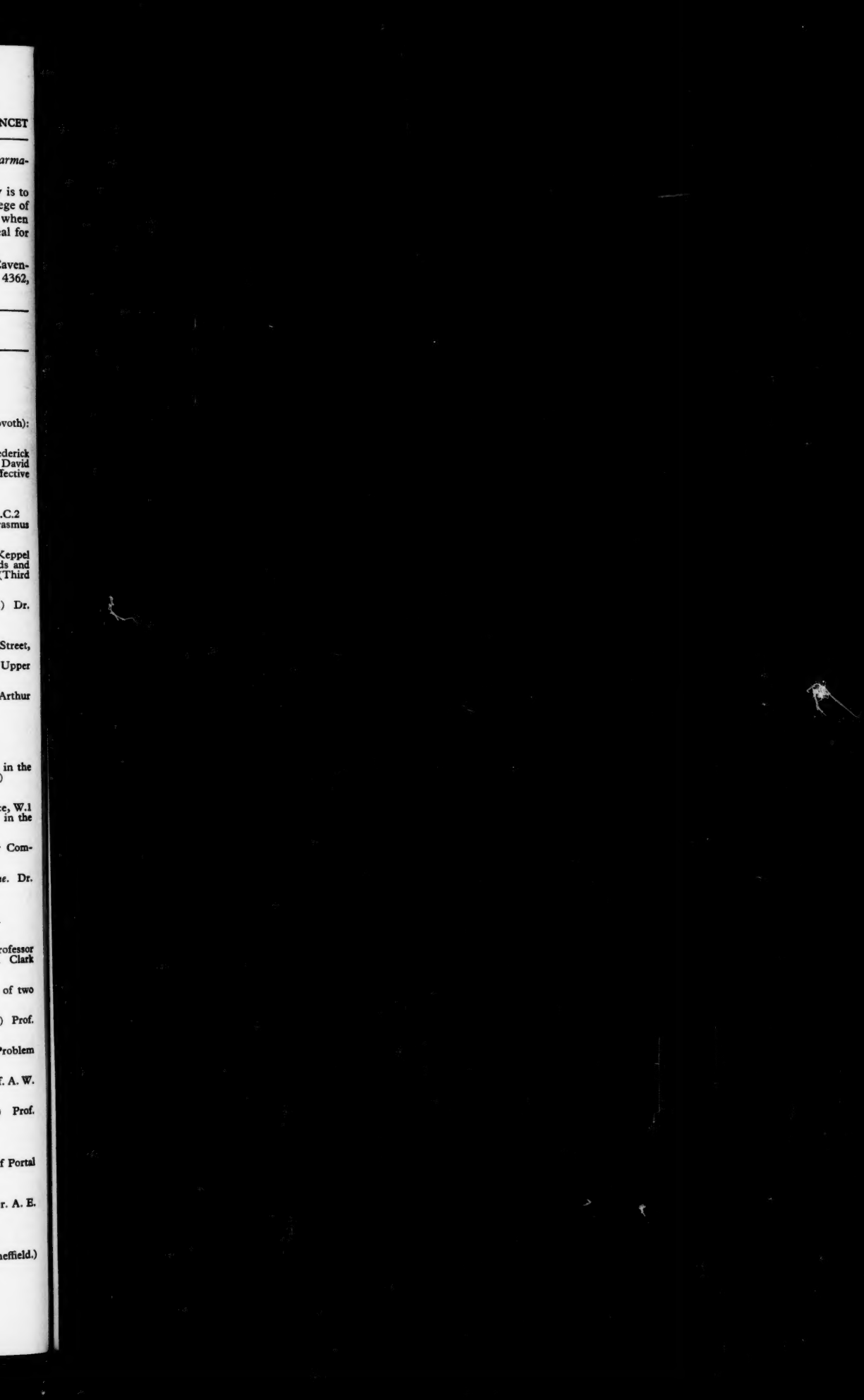
POSTGRADUATE MEDICAL SCHOOL OF LONDON
2 P.M. Prof. G. H. Lathe: Bile-pigment Metabolism.
ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1
8 P.M. *Proctology*. Prof. J. C. Goligher: Sphincter Conservation in the Radical Treatment of Rectal Cancer. (Presidential address.)
INSTITUTE OF DISEASES OF THE CHEST, Brompton, S.W.3
5 P.M. Dr. J. C. Batten: Relapse in Tuberculosis.
ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE, 28, Portland Place, W.1
3.30 P.M. Dr. N. R. Beattie: Task of the Public Health Service in the Field of Social Health.
WEST LONDON MEDICO-CHIRURGICAL SOCIETY
8 P.M. (Wolfson Institute, Hammersmith Hospital, W.12.) Air Commodore W. K. Stewart: Medicine in Space.
MANCHESTER MEDICAL SOCIETY
4.30 P.M. (Medical School, University of Manchester.) *Medicine*. Dr. J. B. L. Howell: Emphysema.

Thursday, 23rd

ROYAL COLLEGE OF PHYSICIANS OF LONDON, Pall Mall East, S.W.1
5 P.M. Prof. Sheila Sherlock: Jaundice. (Bradshaw lecture.)
UNIVERSITY OF LONDON
5.30 P.M. (London School of Hygiene and Tropical Medicine.) Professor Neale: Juvenile Rheumatism. (Fourth of five Heath Clark lectures.)
UNIVERSITY COLLEGE LONDON, Gower Street, W.C.1
5 P.M. Dr. B. R. Rabin: Aspects of Enzyme Catalysis. (First of two lectures.)
BRITISH POSTGRADUATE MEDICAL FEDERATION
5.30 P.M. (London School of Hygiene and Tropical Medicine.) Prof. I. E. Bush: Hormones of the Adrenal Cortex.
LONDON JEWISH HOSPITAL MEDICAL SOCIETY
8.15 P.M. (11, Chandos Street, W.1.) Dr. C. M. Fletcher: The Problem of Observer Variation in Clinical Diagnosis.
HONYMAN GILLESPIE LECTURE
5 P.M. (University New Buildings, Teviot Place, Edinburgh.) Prof. A. W. Kay: Gastrointestinal Surgery and Human Physiology.
UNIVERSITY OF ST. ANDREWS
5 P.M. (Physiology Department, Queen's College, Dundee.) Prof. Harry Harris: Inborn Errors of Metabolism.

Friday, 24th

POSTGRADUATE MEDICAL SCHOOL OF LONDON
10 A.M. Mr. A. H. Hunt: Current Problems in the Treatment of Portal Hypertension.
4 P.M. Dr. L. A. Liversedge: Occupational Cramps.
HUXLEY LECTURE
5.30 P.M. (Royal Society, Burlington House, Piccadilly, W.1.) Dr. A. E. Mourant: Evolution, Genetics, and Anthropology.

Saturday, 25th

ARTHUR HALL LECTURE
3.30 P.M. (Firth Hall, University of Sheffield, Western Bank, Sheffield.) Sir Howard Florey: Electron Microscopy and Surgery.